MEMBERS OF THE CENTER FOR ENVIRONMENTAL STUDIES

Alex Apotsos, Visiting Lecturer in Geosciences
Henry W. Art, Professor of Biology and Environmental Studies
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Ben Benedict, Lecturer in Art
Mary K. Bercaw-Edwards, Associate Professor for Literature of The Sea, Williams-Mystic Maritime Studies Program
Julie C. Blackwood, Assistant Professor of Mathematics
Roger E. Bolton, Professor of Economics, Emeritus
Cory E. Campbell, instructional Technology Specialist
Phoebe A. Cohen, Associate Professor of Geosciences
Anthony J. Carrasquillo, Assistant Professor of Chemistry
David Cassuto, Class of 1946 Visiting Distinguished Professor of Environmental Studies
Jose E.A. Constantine, Assistant Professor of Geosciences
Mea S. Cook, Associate Professor of Geosciences
David P. Dethier, Professor of Geosciences
Joan Edwards, Professor of Biology
Laura Ephraim, Associate Professor of Political Science
Michael Evans, Assistant Director of The Zilkha Center for Environmental initiatives
Jessica M. Fisher, Assistant Professor of English
Antonia Foias, Professor of Anthropology and Sociology
Jennifer L. French, Professor of Spanish
Sarah S. Gardner, Lecturer in Environmental Studies
Matthew Gibson, Assistant Professor of Economics
Lisa Gilbert, Associate Professor of Geosciences and Marine Sciences
ENVIRONMENTAL STUDIES

Environmental issues call upon citizens, organizations, and governments to grasp complex scientific concepts, address conflicting human values, and make difficult economic, political and ethical choices. A proper understanding of environmental issues is therefore an interdisciplinary exercise. The concentration in Maritime Studies is designed to help students to:

• Effectively address complex environmental issues by integrating perspectives from the natural sciences, the social sciences, and the arts and humanities;

• Understand ecological principles and the nature of living systems;
Apply scientific methods to collect environmental data and evaluate environmental quality;
Understand the political and economic factors that inform, enable, and constrain environmental policy;
Understand the social, cultural, and historical factors that shape environmental thought, history, and behavior;
Develop significant understanding of one or more of the essential methodological approaches required in addressing environmental challenges;
Apply their learning in a practical setting.

The program is administered by the Center for Environmental Studies (CES), located in the Class of 1966 Environmental Center. Founded in 1967, CES was one of the first environmental studies programs at a liberal arts college. In addition to the academic program described below, CES is the focus of a varied set of activities in which students lead and participate, often with other members of the Williams community. CES offers extensive resources including databases, funding for student-organizations, and student initiated activities, and generous support for summer research and internships. The Class of 1966 Center, a Living Building and the Program's home, includes a classroom, living room, study rooms, kitchen, as well as student gardens. The CES manages the Hopkins Memorial Forest, a 2600-acre natural area northwest of campus, in which there are field-study sites and a laboratory, and where passive-recreation opportunities may be found in all seasons. CES also operates the Environmental Analysis Laboratory in Morley Science Center. The Maritime Studies concentration builds on the course offerings of the Williams-Mystic Maritime Studies Program at Mystic Seaport.

ADVISING
Concentrators (or first-years and sophomores interested in the concentration offered by CES) are encouraged to talk at any time with the Chair or Associate Director of Environmental Studies, or any other members of CES or Maritime Studies for advice. All incoming concentrators will choose a faculty advisor in the spring of their sophomore year.

Advisors for 2019-20: Henry Art, Sarah Gardner, Pia Kohler, Laura Martin, Mea Cook, James Manigault-Bryant.

CONCENTRATION IN MARITIME STUDIES
The Maritime Studies concentration provides students with an opportunity to explore how humans interact with the environment, including the maritime environment. Understanding the oceans and our interactions with them is of increasing importance in this era of climate change, sea-level rise, fisheries crises, and the internationalization of the high seas. We encourage students to investigate our WaterWorld from the perspectives of the humanities, social sciences, and physical sciences. Maritime Studies is an interdisciplinary, cross-divisional program that includes the literature, history, policy issues, and science of the ocean. Candidates for the concentration in Maritime Studies must complete a minimum of seven courses: the interdisciplinary introductory course (GEOS 104 Oceanography), four intermediate core courses (at Williams-Mystic), an elective, and the senior seminar.

Students who have completed other study-away programs that emphasize maritime studies should consult with the CES chair about the possibility of completing the Maritime Studies concentration.

Required Courses (7 courses)
Introductory Course
MAST/ENVI/GEOS 104 Oceanography
Students who take MAST 211/GEOS 210 Oceanographic Processes at Williams-Mystic can substitute an extra elective in lieu of GEOS 104.
Capstone Course
ENVI/MAST 412 Senior Seminar: Perspectives on Environmental Studies

Core Courses (taken as part of Williams-Mystic program at Mystic Seaport):
MAST/ENGL 231 Literature of the Sea
MAST 311/BIOL 231 Marine Ecology OR MAST 211/GEOS 210 Oceanographic Processes
MAST/ENVI 351/ PSCI 319 Marine Policy
MAST/HIST 352 America and the Sea, 1600-Present

Elective Courses
Elective courses are listed based on either a clear maritime statement in the course description or broad practical/theoretical applicability to maritime studies. Concentrators will take a minimum of one course from the list below. If concentrators find other courses in the catalog that they believe meet the requirements for a MAST elective, they may bring them to the attention of the Chair or Associate Director.
INDEPENDENT STUDY AND WINTER STUDY

In addition to courses fulfilling the Maritime Studies concentration requirements, the following courses are offered:

- MAST 397, 398 Independent Study: Maritime Studies
- MAST 493-W31-494 Senior Thesis: Maritime Studies

Winter study courses play an important role in the program, offering opportunities to learn about aspects of environmental studies with which students would like to become more familiar. We encourage students to bear in mind their interests in the environment and maritime studies when
reviewing each year’s Winter Study offerings.

HONORS IN MARITIME STUDIES

Candidates for honors in Maritime Studies will complete a thesis in their senior year. The project will involve original research (archive, museum, field, or laboratory) followed by on-campus analysis and write-up of results. The thesis may either be a one-semester plus winter study project, or a full year (two semesters plus winter study). In either case, data collection during the summer before the senior year may be necessary. In some cases, the thesis project may be a continuation and expansion of the student’s Williams-Mystic research project. Honors will be awarded if the thesis shows a high degree of scholarship, originality, and intellectual insight.

MAST 104  (S)  Oceanography
Cross-listings: GEOS 104  MAST 104  ENVI 104

Secondary Cross-listing
The oceans cover three quarters of Earth’s surface, yet oceanography as a modern science is relatively young: the first systematic explorations of the geology, biology, physics and chemistry of the oceans began in the late 19th century. This introduction to ocean science includes the creation and destruction of ocean basins with plate tectonics; the source and transport of seafloor sediments and the archive of Earth history they contain: currents, tides, and waves; photosynthesis and the transfer of energy and matter in ocean food webs; the composition and origin of seawater, and how its chemistry traces biological, physical and geological processes; oceans and climate change; and human impacts. This course is in the Oceans and Climates group for the Geosciences major.

Class Format: Remote lectures, students attend a 2-hour lab every other week. Lab meetings will be a mixture of remote, and in-person/hybrid formats. If public health conditions allow, there may be a field trip.

Requirements/Evaluation: two midterm exams, homework, lab work, and a final exam

Prerequisites: none

Enrollment Limit: 48

Enrollment Preferences: first year and second year students, Geosciences majors, Maritime Studies concentrators

Expected Class Size: 48

Grading: yes pass/fail option, no fifth course option

Distributions: (D3)

This course is cross-listed and the prefixes carry the following divisional credit:

GEOS 104 (D3) MAST 104 (D3) ENVI 104 (D3)

Attributes: ENVI Natural World Electives  EXPE Experiential Education Courses  GEOS Group A Electives - Climate + Oceans

Spring 2021

LAB Section: H2  M 1:00 pm - 3:00 pm  Mea S. Cook
LAB Section: H3  W 1:00 pm - 3:00 pm  Mea S. Cook
LEC Section: R1  MWF 10:40 am - 11:30 am  Mea S. Cook

MAST 211  (S)  Oceanographic Processes
Cross-listings: MAST 211  GEOS 210

Primary Cross-listing
This course examines ocean and coastal environmental science issues including carbon dioxide and the ocean's role in climate, El Niño and other ocean-atmosphere oscillations that influence our weather, coastal erosion and other hazards, coastal pollution, and fisheries. The focus is on controlling processes with regional comparisons. Blue water oceanography is conducted in the Atlantic and comparative coastal oceanography includes trips to southern New England shores, and the West and Gulf coasts of the US as part of the Williams-Mystic program. This course is in the Oceans and Climate group for the Geosciences major.

Class Format: including coastal and near-shore field trips, 11 days offshore, and a laboratory or field research project

Requirements/Evaluation: two tests, a research project, and a presentation
Prerequisites: none
Enrollment Limit: 24
Enrollment Preferences: none
Expected Class Size: 10
Grading: yes pass/fail option, yes fifth course option
Unit Notes: offered only at Mystic Seaport
Distributions: (D3)
This course is cross-listed and the prefixes carry the following divisional credit:
MAST 211 (D3) GEOS 210 (D3)
Attributes: ENVI Natural World Electives EVST Living Systems Courses EXPE Experiential Education Courses GEOS Group A Electives - Climate + Oceans
Not offered current academic year

MAST 231 (S) Literature of the Sea
Cross-listings: ENGL 231 MAST 231
Primary Cross-listing
Taking advantage of our maritime museum, coastal setting, and three field seminars, we study canonical and lesser-known novelists, short-story writers, dramatists, and poets who set their works in the watery world, often in the exact places where we travel as a class. We read, for example—depending on fall or spring semester—Ernest Hemingway when sailing on the Straits of Florida, John Steinbeck when exploring Cannery Row on Monterey Bay, and Mark Twain on a steamboat on the Mississippi. We read Kate Chopin on the sands of the Gulf of Mexico, Rudyard Kipling out on Georges Bank, and Herman Melville’s masterpiece Moby-Dick aboard Mystic Seaport’s historic whaleship, the Charles W. Morgan, a vessel nearly identical to the vessel he climbed aboard at age twenty-one. In the classroom we examine these works through a mixture of lecture, small-group discussion, and writing. To further appreciation and analysis, this interdisciplinary course uses students’ emerging knowledge of maritime history and marine science.
Class Format: weekly lectures, including coastal and near-shore field trips and ten days at sea
Requirements/Evaluation: regular papers, class participation, journal-writing, and a final paper
Grading: no pass/fail option, no fifth course option
Unit Notes: offered only at Mystic Seaport
Distributions: (D1)
This course is cross-listed and the prefixes carry the following divisional credit:
ENGL 231 (D1) MAST 231 (D1)
Attributes: AMST Arts in Context Electives ENVI Humanities, Arts + Social Science Electives
Not offered current academic year

MAST 245 (F) Hydrothermal Vents (WS)
Cross-listings: GEOS 245 MAST 245 ENVI 245
Secondary Cross-listing
Hydrothermal vents are perhaps the most alien places on Earth. Many are located on active volcanoes, especially at mid-ocean ridges, where magma super-heats water to form underwater hot springs. Others are located at deep-sea fracture zones, where the exothermic reaction of serpentinization provides the heat to drive hydrothermal circulation. Hydrothermal vents are extreme environments which host unique organisms, like giant tubeworms and giant hydrothermal clams, that are found only at these deep sea oases. This tutorial will examine how and where hydrothermal vents form, the strange and ancient life there, and why they are relevant despite feeling so far removed from our daily lives. Hydrothermal vent science draws on geology, physics, chemistry, and biology, so prior interest or coursework in one or more of those fields is suggested. This course is in the Oceans and Climate group for the Geosciences major.
Class Format: This class will meet remotely. Students will meet in pairs weekly with the instructor for one hour. The entire class will meet once at the beginning of the semester for organizational purposes and at the end of the semester for a synthesis.
Requirements/Evaluation: Five 5-page papers, critiques of tutorial partner's papers, final reflection, and participation
**Prerequisites:** none, open to all students

**Enrollment Limit:** 10

**Enrollment Preferences:** 1. sophomores, 2. first-years, 3. junior and senior GEOS majors and MAST concentrators

**Expected Class Size:** 10

**Grading:** no pass/fail option, no fifth course option

**Distributions:** (D3) (WS)

This course is cross-listed and the prefixes carry the following divisional credit:

GEOS 245 (D3) MAST 245 (D3) ENVI 245 (D3)

**Writing Skills Notes:** Students will write six 5-page papers. The first five papers will be written every other week, alternating with a tutorial partner. Students will receive oral and written feedback during a discussion with the instructor and their tutorial partner. Students will write a final 5-page reflection paper to synthesize their learning.

**Attributes:** ENVI Natural World Electives GEOS Group A Electives - Climate + Oceans MAST Interdepartmental Electives

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**Fall 2020**

TUT Section: RT1 TBA Lisa A. Gilbert

**MAST 263 (F)(S) The Global Ocean: An Interdisciplinary Introduction**

**Cross-listings:** MAST 263 ENVI 263

**Primary Cross-listing**

Though it covers most of the planet, the ocean's importance to everyday life is easy to overlook. Its roles as a cultural symbol, resource, highway, and climate regulator make it essential to life around the world. This interdisciplinary course, team-taught by the faculty of the Williams-Mystic Program, will examine key issues in each of the world's oceans while introducing students to the ways these issues connect multiple disciplines and transcend physical, political, and imaginary ocean boundaries. By drawing on the expertise of the five professors -- from humanities, social sciences, and sciences -- this course facilitates the critical study of the ocean from an interdisciplinary perspective and helps them consider their own role in the shifting relationship between humanity and the ocean. This seminar-style course will meet twice a week online, with students assessed by their participation, response papers, and final project, while helping them apply interdisciplinary skills to pressing sustainability issues connecting the environment and society.

**Class Format:** Remote, including Zoom seminar meetings twice a week

**Requirements/Evaluation:** Five 2-page papers, participation, and a 6-8 page final paper

**Prerequisites:** none, open to all students

**Enrollment Limit:** 20

**Enrollment Preferences:** 1. first years, 2. sophomores, 3. MAST concentrators

**Expected Class Size:** 15

**Grading:** yes pass/fail option, yes fifth course option

**Distributions:** (D3)

This course is cross-listed and the prefixes carry the following divisional credit:

MAST 263 (D3) ENVI 263 (D2)

**Attributes:** ENVI Humanities, Arts + Social Science Electives

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**Fall 2020**

SEM Section: R1 MR 1:30 pm - 2:45 pm Lisa A. Gilbert, Catherine Robinson Hall, Tim J. Pusack, Sofia E. Zepeda, Ned G. Schaumberg, ngs3

**Spring 2021**

SEM Section: R1 MR 1:30 pm - 2:45 pm Catherine Robinson Hall, Tim J. Pusack, Lisa A. Gilbert, Sofia E. Zepeda, Ned G. Schaumberg, ngs3
MAST 265  (F)  Coral Reefs: Ecology, Threats, & Conservation

Cross-listings:  BIOL 165  MAST 265  ENVI 265

Primary Cross-listing

Coral reefs are a fascinating ecosystem found throughout the world's tropical oceans. Corals can thrive in nutrient-poor oceans because of the mutualistic relationship with algal symbionts. And as a foundational species, corals provide a habitat for numerous species, possibly the highest diversity found on the planet. However, these complex and beautiful ecosystems are declining worldwide from a variety of local and global threats. In this course, we will explore coral reef ecology through an in-depth examination of the biotic and abiotic factors contributing to the ecosystem's functioning. We will also investigate the causes and consequences of threats to coral reefs, such as ocean warming, ocean acidification, and resource extraction. Finally, we will identify the many efforts worldwide to conserve coral reefs and promote their resilience. In this seminar course, offered remotely, you will demonstrate your proficiency through knowledge assessments, short writing reflections, a virtual coral fragmentation experiment, and a creative advocacy project. This course aims to deepen your awareness of the complex species interactions on coral reefs and the physical factors affecting coral survival while fostering hope through current conservation efforts.

Class Format: Remote, including Zoom seminar meetings twice a week

Requirements/Evaluation: Four 1-paragraph discussion board post, One 20-question knowledge assessment (quiz), Three 2-page writing reflections, One lab results and discussion write-up 2-3 pages figures included, and a creative (medium is student choice) advocacy project.

Prerequisites: none, open to all students

Enrollment Limit: 20

Enrollment Preferences: 1. First-Year, 2. Sophomores

Expected Class Size: 16

Grading: yes pass/fail option, yes fifth course option

Unit Notes: Does not count for Biology major credit.

Distributions: (D2)

This course is cross-listed and the prefixes carry the following divisional credit:
BIOL 165 (D3) MAST 265 (D2) ENVI 265 (D2)

Attributes: ENVI Natural World Electives

Fall 2020

SEM Section: R1    MW 10:00 am - 11:15 am     Tim J. Pusack

MAST 266  (S) Reading Water  (WS)

Cross-listings:  ENVI 266  MAST 266

Primary Cross-listing

Water has such profound and far-reaching influence on individuals, societies, and the planet that it simultaneously risks going overlooked and appearing clichéd. Human beings are made of it and need it to live, yet will die if immersed in it. It is venerated by cultures around the world, yet most people either cannot access clean water, or don't know where their clean water is piped in from. It covers the earth's surface, and has shaped it over eons, yet scientists are still not sure how it came to be here in the first place. This wide-ranging influence also presents challenges for traditional academic structures; thinking about water demands crossing times, spaces, and disciplines. This course will explore the wide-ranging and diverse ways water impacts individuals, cultures, and the environments they call home by drawing on a range of content: hydrology, literature, political theory, storytelling, geography, and more. To do this, we will also develop and examine methods of critically reading as "non-experts"--reading scientific articles as rhetorical objects and reading for scientific principles in literature, for instance--to explore what interdisciplinary thinking opens up (and inhibits), and thus how to effectively engage with and create interdisciplinary work. The goal here is not to define water's cultural or scientific importance, or to determine which disciplines "best" combine to explain water, or to come up with humanities-based solutions to "the water crisis." Rather, these texts, and the water that flows through them will help us explore the opportunities and limits of human perceptions of the other-than-human world. It will help us consider the extent to which those perceptions both shape, and are shaped by, a seemingly simple molecule. And it will help us imagine epistemologies and ontologies that account for the ways water simultaneously flows through us, around us, and through the deep geological history of the planet. Course Texts: Tristan Gooley -- How to Read Water (selections) Vandana Shiva -- Water Wars (selections) Luna Leopold -- Water, Rivers, and Creeks (selections) Richard White -- The Organic Machine Linda Hogan -- Solar Storms Marc Reisner -- Cadillac Desert Jesmyn Ward -- Salvage the Bones John McPhee -- "Atchafalaya" Emmi Itäranta -- Memory of Water Brenda Hillman -- "The Hydrology of California"
Class Format: This class will be remote, meeting synchronously. The class will be primarily discussion-based, and will ask students to lead and structure discussions. Students will have questions, reflections, and insights prepared before class, and use those to drive our in-class activities.

Requirements/Evaluation: 100pg of reading a week, give or take. Approx 20-25 pages of written work throughout the semester.

Prerequisites: None

Enrollment Limit: 20

Enrollment Preferences: Preference to majors, and then to sophomores and juniors, respectively.

Expected Class Size: 20

Grading: yes pass/fail option, no fifth course option

Distributions: (D1) (WS)

This course is cross-listed and the prefixes carry the following divisional credit:

ENVI 266 (D1) MAST 266 (D1)

Writing Skills Notes: Students will write four papers of increasing complexity that will require workshopping and drafts. Each of these papers will receive forward-looking writing feedback from me. The first paper centers on paragraph-level stylistic choices, the second on argument/evidence connections, the third on genre, and the final paper synthesizes these writing skills. In addition, students' final grades will allow for revision of earlier papers to encourage and assess growth of writing skills.

Spring 2021

SEM Section: R1  MR 3:15 pm - 4:30 pm  Ned G. Schaumberg

MAST 267 (F) Coastal Communities and Climate Justice (DPE)

Cross-listings: PSCI 256 GEOS 257 MAST 267 ENVI 267

Primary Cross-listing

Climate change poses extraordinary challenges to our country’s coastal communities; the impacts of which will not be borne equally. Access to innovative technological, scientific, financial and legal resources is controlled by policy makers. Equal access is critical for the sustainability of our coastal communities. But fair decisions require vulnerable communities to have a voice in local climate change adaptation decisions. This seminar course will introduce you to basic concepts of climate justice in the context of our Nation’s coastal communities, guided by the UN Framework Convention on Climate Change. The course will introduce you to fundamental coastal and ocean-based climate-induced impacts with a focus on sea level rise, ocean warming, ocean acidification and coastal infrastructure. We will examine these impacts, as well as local, state, regional and federal policy responses to them through the lens of climate justice. We will identify what’s working and what more needs to be done to advance climate equity and justice in the wake of formidable global and local change. Proficiency will be demonstrated through class participation, work conducted in small group strategy exercises, discussion board posts, short research assessment papers and a final written project. There are three goals in this course: first to broaden your understanding of the disproportionate effects of climate change to underrepresented, disempowered, poor, urban and indigenous populations living in American coastal communities; second to provide you with tools to identify inequity; third, to increase your own voice to promote avenues to seek climate justice.

Class Format: remote

Requirements/Evaluation: Weekly Readings; Class Participation; Small group strategy exercises; Four on-line discussion board posts; Two 2-3-page data & research assessment papers; Final written project--multiple formats available

Prerequisites: none

Enrollment Limit: 20

Enrollment Preferences: first-years and sophomores

Expected Class Size: 15

Grading: yes pass/fail option, no fifth course option

Unit Notes: social science; This course does not count toward the Geosciences Major.

Distributions: (D2) (DPE)

This course is cross-listed and the prefixes carry the following divisional credit:

PSCI 256 (D2) GEOS 257 (D2) MAST 267 (D2) ENVI 267 (D2)
Difference, Power, and Equity Notes: This course examines the persistent disproportionate climate changes impacts on underrepresented, poor, urban and indigenous populations living in U.S. coastal communities. Students will analyze multi-disciplinary data and conduct research to reveal unequal distributions of power and resources and to strengthen their integrative, analytical, writing, and advocacy skills. They will structure discussions on the pervasiveness of climate injustice and craft potential avenues for corrective actions.

Attributes: ENVI Humanities, Arts + Social Science Electives  ENVI Environmental Policy  MAST Interdepartmental Electives

Fall 2020
SEM Section: R1  MR 3:15 pm - 4:30 pm  Catherine Robinson Hall

MAST 268 (S) Debating Ocean Biodiversity at the Intersection of Science and Policy

Cross-listings:  ENVI 268  MAST 268

Primary Cross-listing
Biodiversity in the ocean is facing an onslaught of challenges, both directly and indirectly. It is likely that we are undergoing a sixth mass extinction event, where diversity of life on earth is stunningly at risk. Fortunately, however, we are also finding innovative ways to solve issues and attempt to stave off these dramatic changes to our ecosystems. These solutions potentially have both positive and negative effects. Difficult tradeoffs must be weighed and decisions must be made as people wrestle with known knowns, known unknowns, and unknown unknowns. In this class, we will explore five issues that relate to biodiversity in the ocean. You will have the opportunity to investigate one side of an issue, to collect supporting information, and to advocate for your position all while learning about current biodiversity issues in the ocean. You will be challenged to weigh conflicting evidence to find a positive outcome. Throughout the class you will practice critical thinking, evaluation, and synthesizing skills as you work with multiple viewpoints. Class time will include lecture, in-class group work, and student-led debates of timely, controversial issues. You will be assessed on summaries of information, reflections on topics, and a final project on an issue of your choice relating to ocean biodiversity.

Class Format: Remote, including Zoom seminar meetings twice a week
Requirements/Evaluation: Five 2-page papers, participation, and a 6-8 page final paper
Prerequisites: none, open to all students
Enrollment Limit: 20
Enrollment Preferences: 1. first years, 2. sophomores, 3. MAST concentrators
Expected Class Size: 15
Grading: yes pass/fail option, yes fifth course option
Distributions: (D2)

This course is cross-listed and the prefixes carry the following divisional credit:
ENVI 268 (D2) MAST 268 (D2)

Attributes: ENVI Humanities, Arts + Social Science Electives  MAST Interdepartmental Electives

Spring 2021
SEM Section: R1  MW 10:00 am - 11:15 am  Catherine Robinson Hall, Tim J. Pusack

MAST 311 (S) Marine Ecology

Cross-listings:  MAST 311  BIOL 231

Primary Cross-listing
Using the principles of evolutionary biology and experimental ecology, this course examines the processes that control the diversity, abundance and distribution of marine organisms. Major marine communities, including estuaries, the rocky shore, sandy beaches, salt marshes, coral reefs, and the deep sea are discussed in detail.

Class Format: including coastal and near-shore field trips, 10 days offshore, and a laboratory or field research project
Requirements/Evaluation: two tests, a research project, and a presentation
Prerequisites: BIOL 101 or GEOS/MAST 104, or permission of instructor
Grading: yes pass/fail option, yes fifth course option
In coastal communities, increasing flood damage from storm surges and chronic inundation by seawater are already happening as a result of sea level rise. How do we know what contributes to the observed change in sea level in the last century? What does the geological record teach us about what controls the natural variation in sea level on short and long timescales? How can we use this information to separate anthropogenic effects from natural change in modern systems? And how does this inform us on what to expect through the 21st century and beyond? In this course, we will examine how sea level is reconstructed using geological archives and how coral-based sea level data led to breakthroughs in our understanding of the long-term evolution of the ocean and climate, the controls in the timing of ice age cycles, the singularity of modern climate change, and how high the future seas will rise. During Spring Break, the class will travel to Barbados, a renowned locality for Quaternary sea level reconstruction, to observe modern and ancient reefs, and collect samples that will be the basis of individual or group projects in the second half of the semester. Participation in the Spring Break trip is not required for successful completion of the course, but course enrollment is necessary to attend the trip. This course is in the Oceans and Climate group for the Geosciences major.

Requirements/Evaluation: short papers, labs, participation in discussion, and a research project
Prerequisites: GEOS 104 or GEOS 210 or GEOS 215 or MAST 311 or permission of instructor
Enrollment Limit: 10
Enrollment Preferences: Geoscience majors, students who commit to the Spring Break trip
Expected Class Size: 10
Grading: no pass/fail option, no fifth course option
Distributions: (D3)

This course is cross-listed and the prefixes carry the following divisional credit:
GEOS 324 (D3) MAST 324 (D3) ENVI 324 (D3)
Attributes: ENVI Natural World Electives EXPE Experiential Education Courses GEOS Group A Electives - Climate + Oceans
Not offered current academic year
Enrollment Preferences: must be enrolled at Williams-Mystic in Connecticut

Expected Class Size: 22

Grading: no pass/fail option, yes fifth course option

Unit Notes: offered only at Williams-Mystic at Mystic Seaport Museum in CT

Distributions: (D2) (WS)

This course is cross-listed and the prefixes carry the following divisional credit:

ENVI 351 (D2) MAST 351 (D2) PSCI 319 (D2)

Writing Skills Notes: Each student writes a short paper identifying research goals, a draft outline of the research paper, a draft of the research paper (10-15 pp.), as well as a final 8-10 pp. research paper. Each submission receives written feedback from professor, including additional research resources, input on grammar, structure, language, analysis as well as an assessment of and assistance with credibility and feasibility of proposed final policy recommendation; several individual conferences held as well.

Attributes: ENVI Environmental Policy EXPE Experiential Education Courses POEC Comparative POEC/Public Policy Courses

Not offered current academic year

MAST 352 (S) American Maritime History (DPE) (WS)

Cross-listings: HIST 352 MAST 352

Primary Cross-listing

This course surveys American maritime history from the colonial era to the 21st century. We will consider the dynamic relationship between the sea and American life, and the broad influence that each has had on the other. Special emphasis will be placed on how diverse peoples shaped and experienced America's maritime past. We will sample from different fields of historical inquiry including labor, environmental, cultural, political, technological, and energy history in order to gain a deeper understanding of America's maritime heritage.

Class Format: classroom discussion as well as field seminars

Requirements/Evaluation: class participation, weekly response papers, three longer papers

Prerequisites: BIOL 101 or GEOS/MAST 104, or permission of instructor

Grading: no pass/fail option, no fifth course option

Unit Notes: offered only at Mystic Seaport

Distributions: (D2) (DPE) (WS)

This course is cross-listed and the prefixes carry the following divisional credit:

HIST 352 (D2) MAST 352 (D2)

Writing Skills Notes: Students must complete weekly 1-page papers, two 5-page papers, and a final 10- to 15-page paper. Additionally, students will participate in several in-class writing workshops and peer critiques that cover argument and style. Students will receive from the instructor timely comments on their writing skills, with suggestions for improvement.

Difference, Power, and Equity Notes: Maritime activity has long provided opportunities for some while burdening others with tremendous costs. From the slave trade and the encounters between native and European mariners to the power wielded by multi-national shipping conglomerates, this course investigates contests over power, empire, and capitalism as they played out on the maritime stage.

Attributes: AMST Space and Place Electives ENVI Humanities, Arts + Social Science Electives EXPE Experiential Education Courses HIST Group F Electives - U.S. + Canada HIST Group P Electives - Premodern

Not offered current academic year

MAST 397 (F) Independent Study: Maritime Studies

Maritime Studies independent study.

Grading: yes pass/fail option, yes fifth course option

Distributions: No divisional credit

Fall 2020

IND Section: H1 TBA Nicolas C. Howe
**MAST 398 (S) Independent Study: Maritime Studies**

Maritime Studies independent study.

**Grading:** yes pass/fail option, yes fifth course option

**Distributions:** No divisional credit

Spring 2021

IND Section: H1  TBA  Nicolas C. Howe

**MAST 402 (S) Senior Seminar: Perspectives on Environmental Studies** *(WS)*

**Cross-listings:** MAST 402  ENVI 412

**Secondary Cross-listing**

The Environmental Studies and Maritime Studies programs provide students with an opportunity to explore the myriad ways that humans interact with diverse environments at scales ranging from local to global. The capstone course for Environmental Studies and Maritime Studies, this seminar brings together students who have specialized in the humanities, social studies and the sciences to exchange ideas across these disciplines. Over the course of the seminar, students will develop a sustained independent research project on a topic of their choice, and they will have opportunities throughout the semester to meet with guest speakers to discuss environmental work outside the academy.

**Requirements/Evaluation:** active participation, discussion leading, several smaller assignments and multi-step capstone project

**Prerequisites:** declared major/concentration in Environmental Studies or Maritime Studies, ideally to be taken in final semester at Williams

**Enrollment Limit:** 14

**Enrollment Preferences:** Environmental Studies majors and concentrators, Maritime Studies concentrators

**Expected Class Size:** 10

**Grading:** no pass/fail option, no fifth course option

**Unit Notes:** required course for students wishing to complete the Maritime Studies concentration

**Distributions:** No divisional credit *(WS)*

This course is cross-listed and the prefixes carry the following divisional credit:

MAST 402  No divisional credit  ENVI 412  No divisional credit

**Writing Skills Notes:** This course is focused on building up cross-disciplinary writing and communication skills. There will be a multi-step capstone project that emphasizes writing, and there will be opportunities to revise and resubmit work.

**Attributes:** ENVI Core Courses  EVST Core Courses  EVST Senior Practicum

Spring 2021

SEM Section: H1  Cancelled

SEM Section: H2  TR 11:30 am - 12:45 pm  W 2:50 pm - 3:40 pm  Nicolas C. Howe

**MAST 404 (S) Coastal Processes and Geomorphology** *(QFR)*

**Cross-listings:** ENVI 404  MAST 404  GEOS 404

**Secondary Cross-listing**

Can people live safely along the coast? Recent events like SuperStorm Sandy and the Tohoku Tsunami have shown us how the ocean can rise up suddenly and wreak havoc on our lives and coastal infrastructure. Only educated geoscientists can evaluate the risks and define informed strategies to prevent future coastal catastrophes. Currently almost half the global population lives within 100 km of the coast, with a large percent of those living in densely populated cities (e.g., New York, New Orleans, Los Angeles, Shanghai, Hong Kong, Cape Town, Sydney, Mumbai). Despite the growing risks and challenges associated with climate change and rising sea levels, the coastal population continues to grow rapidly. To help ensure these growing populations can live safely along the coast requires a detailed understanding of the processes that shape the coastal zone. These processes act across a variety of scales, from deep-time geologic processes that dictate coastal shape and structure, to decadal-scale processes that determine shoreline position and evolution, to weekly and daily processes such as storms and tides. This course will provide an in-depth look at the forces—wind,
waves, storms, and people—that shape the coastal zone, as well as the geologic formations—sandy beaches, rocky cliffs, barrier islands, deltas, and coral reefs—that are acted upon and resist these forces. Coastal dynamics are strongly affected by human interventions, such as seawalls, dredged channels, and sand dune removal, as well as by sea level rise and changes in storm frequency and magnitude associated with climate change. Finally, the course will provide students with a perspective on how the U.S. seeks to manage its coastal zone, focusing on sea level rise and coastal development. This class will include a quantitative lab that will use MATLAB software to model and evaluate various coastal processes. Students will gain a basic understanding of MATLAB functionality, and will be asked to independently apply what they have learned to various data sets provided by the instructor.

Class Format: lecture two times a week with a lab one time per week
Requirements/Evaluation: lab reports, tests, and an independent research project
Prerequisites: Either GEOS 104 or GEOS 210; or permission of instructor
Enrollment Limit: none
Enrollment Preferences: senior Geosciences majors, then juniors
Expected Class Size: 10
Grading: yes pass/fail option, yes fifth course option
Unit Notes: As a 400-level seminar, this capstone course is intended to build on and extend knowledge and skills students have developed during previous courses in the major
Distributions: (D3) (QFR)

This course is cross-listed and the prefixes carry the following divisional credit:
ENVI 404 (D3) MAST 404 (D3) GEOS 404 (D3)

Quantitative/Formal Reasoning Notes: This course will involve the use of MATLAB software to quantitatively analyze coastal process and geomorphological data.
Attributes: ENVI Natural World Electives
Not offered current academic year

MAST 493  (F) Senior Thesis: Maritime Studies
Maritime Studies senior thesis.
Grading: no pass/fail option, no fifth course option
Distributions: No divisional credit

Fall 2020
HON Section: H1 TBA Nicolas C. Howe

MAST 494  (S) Senior Thesis: Maritime Studies
Maritime Studies senior thesis.
Grading: no pass/fail option, no fifth course option
Distributions: No divisional credit

Spring 2021
HON Section: H1 TBA Nicolas C. Howe

Winter Study  ---------------------------------------------------------------

MAST 31  (W) Sen Thesis: Maritime Studies
Maritime Studies senior thesis.
Class Format: independent study
Grading: pass/fail only
Not offered current academic year

MAST 99  (W)  Independent Study: Maritime Studies
Open to upperclass students. Students interested in doing an independent project (99) during Winter Study must make prior arrangements with a faculty sponsor. The student and professor then complete the independent study proposal form available online. The deadline is typically in late September. Proposals are reviewed by the pertinent department and the Winter Study Committee. Students will be notified if their proposal is approved prior to the Winter Study registration period.

Class Format: independent study
Grading: pass/fail only
Not offered current academic year