The following document includes course information for EOS courses in Fall 2020

Section 1
Includes a table of catalog entries as of 7/14/2020
(Please note that the Class Finder provided by the Registrar’s office will always be the most up to date record for this table of information, but we expect no major changes to this information).

Section 2
Includes supplements for EOS offerings as of 12pm 7/14/2020
These supplements are intended to help you understand how remote offerings will be supported this coming fall.

Current supplements include:
  • EOS 1070
  • EOS 1105
  • EOS 2005 *
  • EOS 2225
  • EOS 2330
  • EOS 2345
  • EOS 2585 *
  • EOS 2680 *
  • EOS 3515

*added 7/14

This package is intended to answer basic questions about EOS offerings, but - as always- reach out to faculty for any class you may have questions about.

Department of Earth and Oceanographic Science
7/14/202
Sea-Level Rise: Science, Policy, and Society

Peter Lea

T 11:00 AM - 12:20 PM
W 7:00 PM - 8:20 PM
F 1:00 PM - 2:20 PM

Prerequisites: None

Course description from catalog:

Global sea-level rise is accelerating due to climate change. Such a rise, combined locally with sinking land and/or trapping of coastal sediment, creates dramatic impacts on human lives and property, as well as coastal ecosystems and the services they provide. Explores the scientific basis for sea-level rise and projections of future impacts, options for policy responses over decadal and single-event (disaster) time scales, and narratives about coastal populations. What are trade-offs between armoring and retreat from the coast? Are disasters natural or human-caused? How do race and socioeconomic status influence risk and recovery? Who shapes the narratives on coastal residents and refugees? Who controls the planning process, and how should science be communicated in times of hyper-partisanship?

Investigating Earth

Jacky Baughman and Joanne Urquhart

T 12:30 PM - 1:50 PM
R 08:00 AM - 09:20 AM
F 2:30 PM - 3:50 PM

Prerequisites: None

Course description from catalog:

Dynamic processes, such as mountain building, earthquakes, and volcanic activity, shape the earth. Class lectures and exercises examine these processes using the framework of plate tectonics. During weekly laboratories, students explore geology topics through accessible field experiences along the Maine coast, use 3D models and geologic maps, and measure and interpret original field and analytical data. Students synthesize the course curriculum and their laboratory findings through a final project.

Biogeochemistry: An Analysis of Global Change

Phil Camill and Cathryn Field

M 2:30 PM - 3:50 PM
W 11:30 AM - 12:50 PM
F 08:30 AM - 09:50 AM

Prerequisites: EOS 1100 - 1999 or BIOL 1102 or BIOL 1109 or CHEM 1092 or CHEM 1102 or CHEM 1109 or CHEM 1110 or ENVS 1102 or ENVS 1104 or ENVS 1515

Course description from catalog:

Understanding global change requires knowing how the biosphere, geosphere, oceans, ice, and atmosphere interact. An introduction to earth system science, emphasizing the critical interplay between the physical and living worlds. Key processes include energy flow and material cycles, soil development, primary production and decomposition, microbial ecology and nutrient transformations, and the evolution of life on geochemical cycles in deep time. Terrestrial, wetland, lake, river, estuary, and marine systems are analyzed comparatively. Applied issues are emphasized as case studies, including energy efficiency of food production, acid rain impacts on forests and aquatic systems, forest clearcutting, wetland delineation, eutrophication of coastal estuaries, ocean fertilization, and global carbon sinks. Lectures and three hours of laboratory or fieldwork per week.

Structural Geology and Analysis

Emily Peterman

T 08:00 AM - 09:20 AM
W 4:00 PM - 5:20 PM
F 11:30 AM - 12:50 PM

Prerequisites: EOS 1105 or EOS 1305 (same as ENVS 1104) or EOS 1505 (same as ENVS 1102) or EOS 2005 (same as ENVS 2221)

Course description from catalog:

Geologic structures provide evidence of the dynamic deformation and evolution of the Earth’s crust. Analysis of these structures yields insight into the processes and products of deformation. This course explores: the mechanics of rock deformation, qualitative and quantitative analysis of structural features, techniques of strain analysis, and synthesis of geologic data in a spatial and temporal context. We examine evidence of deformation at scales that range from the plate-tectonic scale to the microscopic scale of individual minerals. Weekly laboratories focus on problem solving through the use of geologic maps, cross-sections, stereographic projections, strain analysis, virtual field trips, and an array of software applications designed for visualizing and interrogating spatial datasets. Students complete a final project involving the techniques of structural geology and analysis.

Additional Course information provided by EOS faculty for Fall 2020:

Additional information provided by faculty with direct email inquiry.
### EOS 2330 / ENVS 2266 Quaternary and glacial geology: landscape and climate dynamics in the recent geologic past

- **Instructor**: Fame, Michelle
- **Class meeting times**: Actual meeting times to be customized by faculty within these slots for Yellow Block 1 (FYWS and Non FY Classes): TR 09:30 AM - 10:50 AM
- **Prerequisites**: EOS 1100 or higher
- **Course description from catalog**: The past 2.6 million years of Earth's history, known as the Quaternary, is uniquely characterized by intense and frequent swings in global climate. The record of both 'Ice Ages' and interglacial warming in Earth's recent geologic past can be studied through many lenses of Earth science. In this course we will explore how sedimentology, geomorphology, and dating methods can be applied to reconstruct past environments associated with Quaternary climate shifts. Specific topics include Quaternary climate records and forcing mechanisms, basic glacial dynamics, isostasy and sea level changes, sediments, landforms, and dating methods. Students will complete a semester long project investigating the Quaternary record of a specific region of the world and will participate in several in-person or virtual field trips exploring the Quaternary record of New England.

### EOS 2345 / ENVS 2270 Geomorphology: Form and Process at the Earth's Surface

- **Instructor**: Michelle Fame
- **Class meeting times**: M 1:00 PM - 2:20 PM, W 10:00 AM - 11:20 AM, R 3:30 PM - 4:50 PM
- **EOS 1105 or EOS 2005 (same as ENVS 2221) or ENVS 2221**
- **Course description from catalog**: Earth's surface is marked by the interactions of the atmosphere, water and ice, biota, tectonics, and underlying rock and soil. Even familiar landscapes beget questions on how they formed, how they might change, and how they relate to patterns at both larger and smaller scales. Examines Earth's landscapes and the processes that shape them, with particular emphasis on rivers, hillslopes, and tectonic and climatic forcing.

### EOS 2365 Coastal Processes and Environments

- **Instructor**: Peter Lea
- **Class meeting times**: M 10:00 AM - 11:20 AM, T 5:00 PM - 6:20 PM, R 11:00 AM - 12:20 PM
- **Prerequisites**: EOS 1105 or EOS 1305 (same as ENVS 1104) or EOS 1505 (same as ENVS 1102) or EOS 2005 (same as ENVS 2221)
- **Course description from catalog**: Coasts are among the most densely populated and dynamic components of the earth system, with forms that reflect the interplay among sediment delivery, reshaping by waves and coastal currents, changes in land subsidence and/or sea levels, and human interventions. Understanding these processes and how they may change is a first step toward reducing risk and developing resilient coastal communities. Examines coastal environments (e.g., deltas, barrier islands, beaches, salt marshes), the processes that shape them, and underlying controls. Considers impacts of climate change and sea-level rise on coastal erosion and flooding, and trade-offs involved in human responses to such problems.

### EOS 2585 / ENVS 2282 Ocean and Climate

- **Instructor**: Stefan Gary
- **Class meeting times**: M 11:30 AM - 12:50 PM, T 7:00 PM - 8:20 PM, R 12:30 PM - 1:50 PM
- **Prerequisites**: Two of either EOS 1505 (same as ENVS 1102) or EOS 2005 (same as ENVS 2221) or either ENVS 1102 or ENVS 2221 and MATH 1600 or Placement in MATH 1700 (M) or Placement in MATH 1750 (M) or Placement in MATH 1800 (M) or Placement in MATH 2000, 2200, 2206 (M)
- **Course description from catalog**: The ocean covers more than 70 percent of Earth's surface. It has a vast capacity to modulate variations in global heat and carbon dioxide, thereby regulating climate and ultimately life on Earth. Beginning with an investigation of paleo-climate records preserved in deep-sea sediment cores and in Antarctic and Greenland glacial ice cores, the patterns of natural climate variations are explored with the goal of understanding historic climate change observations. Predictions of polar glacial and sea ice, sea level, ocean temperatures, and ocean acidity investigated through readings and discussions of scientific literature. Weekly laboratory sessions devoted to field trips, laboratory experiments, and computer-based data analysis and modeling to provide hands-on experiences for understanding the time and space scales of processes governing oceans, climate, and ecosystems. Laboratory exercises form the basis for student research projects. Mathematics 1700 is recommended.

### Additional Course information provided by EOS faculty for Fall 2020:

- **updates pending**
### Course Information:

#### EOS 2680: Ocean Carbon Climate Change Solutions

- **Instructor:** Stefan Gary
- **Meeting Times:**
  - M 7:00 PM - 8:20 PM
  - W 2:30 PM - 3:50 PM
  - F 10:00 AM - 11:20 AM
- **Prerequisites:**
  - Three of EOS 1100 - 1999
  - EOS 2005 (same as ENVS 2221)
  - MATH 1600 or Placement in MATH 1700 (M) or Placement in MATH 1750 (M) or Placement in MATH 1800 (M)
- **Course Description:**
  As the largest decadal-to-millennial timescale carbon store on Earth, the ocean has outstanding potential for sequestering carbon dioxide from the atmosphere. And, as a significant fraction of the global population lives near the ocean, ocean carbon solutions have the potential to reach huge markets and directly touch the lives of billions. This course explores the ocean's possible contribution to the reversal of climate change via a multiple-perspective, critical assessment of natural and geoengineering solutions for increasing ocean carbon uptake or reducing emissions. Course work will focus on analysis of open-ended problems based on current research papers, the use of real-world, open-source quantitative tools for mapping and scaling up ocean climate solutions, and sharing results via in-class presentations.

#### EOS 2810 / PHYS 2810 / ENVS 2810: Atmospheric and Ocean Dynamics

- **Instructor:** Mark Battle
- **Meeting Times:**
  - M 1:00 PM - 2:20 PM
  - W 10:00 AM - 11:20 AM
  - R 3:30 PM - 4:50 PM
- **Prerequisites:** PHYS 1140
- **Course Description:**
  A mathematically rigorous analysis of the motions of the atmosphere and oceans on a variety of spatial and temporal scales. Covers fluid dynamics in inertial and rotating frames.

#### EOS 3515: Research in Oceanography: Topics in Paleoceanography

- **Instructor:** Michèle LaVigne
- **Meeting Times:**
  - M 2:30 PM - 3:50 PM
  - W 11:30 AM - 12:50 PM
  - F 08:30 AM - 09:50 AM
- **Prerequisites:** EOS 2005 (same as ENVS 2221) or ENVS 2221
- **Course Description:**
  The ocean plays a key role in regulating Earth’s climate and serves as an archive of past climate conditions. The study of paleoceanography provides a baseline of natural oceanographic variability against which human-induced climate change must be assessed. Examination of the oceans’ physical, biological, and biogeochemical responses to external and internal pressures of Earth’s climate with focus on the Cenozoic Era (past 65.5 million years). Weekly labs and projects emphasize paleoceanographic reconstructions using deep-sea sediments, corals, and ice cores. Includes a laboratory and fulfills the 3000-level research experience course requirement for the EOS major.
**Why sea-level rise?**
Ongoing and accelerating sea-level rise creates a “wicked problem” at global, regional and local scales. Among the vexing issues for society are potential displacement of millions of coastal residents, increased disaster impacts, failure of coastal real-estate markets, and exacerbated inequities among diverse coastal residents. Solutions are not straightforward, and will require unprecedented collective action.

The science of sea-level rise is foundational to the problem, and you will learn why such rise is occurring, how and why it varies along the world’s coasts, and how well future rates can be estimated. But science is only one facet of addressing the larger issues, and you will delve into the factors that inform (and often stymie) policy development and social/environmental justice. Among the skills you will learn are 1) applying the scientific basis of present and future sea-level rise to a variety of policy and societal cases associated with populated coasts, 2) articulating how sea-level-rise policies respond to non-scientific influences (e.g., public vs. private, economic, political, risk perception, cognitive biases) for both long-term (decadal) and short-term (e.g., hurricane/storm) time scales, 3) providing examples of how different forms of framing influence perceptions of complex sea-level-rise issues, particularly with respect to inequities and environmental justice, and 4) researching a sea-level-rise topic of your choice, using peer-reviewed and other literature, and preparing a digital poster that clearly communicates your findings.

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**What will we be doing in this class?**
Asynchronous activities will include viewing videos and annotating regular readings on relevant sea-level topics and cases. The class will meet synchronously in Block 8 on Tuesdays (11:00 AM-12:20 PM ET) and Fridays (1:00 – 2:20 PM ET); [no meetings on Wednesdays]. Synchronous class meetings might begin with your questions about the learning materials (readings, videos) that were assigned, breakout rooms where you discuss topics/cases, analyze sea-level data, and/or interpret Google Earth images in small groups, brief presentations from these groups back to the class, short reflections, summaries of key ideas, and a preview of coming attractions. Grades will be based on six short bi-weekly essays, participation in synchronous activities, and the culminating digital posters (done individually or in pairs).
Investigating Earth – Fall 2020

Instructors:  Professor Jacky Baughman – jbaughma@bowdoin.edu
              Lab Instructor Joanne Urquhart – jurquhar@bowdoin.edu

Time Block 9:  Tuesday @ 12:30-1:50 pm (Eastern Time) – Full class activity and discussion
               Thursday @ 8:00-9:20 am (ET) – Lab 1, ½ class, appropriate time zone only
               Friday @ 2:30-3:50 pm (ET) – Lab 2, ½ class, appropriate time zone only

What is “Investigating Earth”?  
Dynamic processes, such as earthquakes, volcanoes, and glaciers, shape the earth on which we live. In this class, we will examine these processes using the framework of plate tectonics. You will be asked to make observations, identify patterns in incomplete datasets, and form and test hypotheses to interpret the mechanisms that drive Earth’s dynamic processes. Through a series of laboratory case studies, you will unravel the geologic history and evolution of the Maine Coast and other noteworthy locations using course content knowledge, and real geologic samples, maps, and datasets. Each student will be provided an Investigating Earth kit that includes mineral and rock samples, and tools and materials to complete course activities and laboratory case studies outside of the classroom.  

Some of the most pressing challenges of our time and our future include: assessing hazards in active tectonic regions; developing a sustainable Earth resource supply, including energy; predicting Earth’s response to changes in climate, tectonics, and anthropogenic forces; and sharing scientific findings with diverse audiences. These are complex, multi-dimensional problems and addressing these challenges will require the inclusion of diverse perspectives, effective collaboration, working with incomplete datasets, and communicating. Successful completion of this course satisfies INS and “a” requirements.

What are the learning goals of this class?
• Identify patterns and trends within and among datasets
• Create and evaluate hypotheses with rigorous, well-supported data and evidence
• Use data to interpret in 2D, 3D, and predict the 4D evolution of processes
• Work individually and collaboratively
• Communicate your findings clearly and convincingly
• Reflect deeply on your role in the earth system and orient yourself in earth history

What topics will the course cover?  
The course will be broken up into 7 modules, each lasting approximately 2-weeks. Modules include:
1. Earth as a System
2. Plate Tectonics
3. Minerals and Igneous Processes
4. Sedimentary Systems
5. Metamorphism and Mountain Building
6. Geologic Time
7. Surface Processes

What will a typical week look like?  
You will be responsible for watching ~40 minutes of pre-recorded lecture each week and reading one textbook chapter. This material will prepare you for a live, full class demonstration, activity, and/or
EOS 1105 Supplement to catalog

discussion each Tuesday. During our live class on Tuesday, you will have the opportunity to ask questions on course learning material and engage with classmates and instructors. On Thursday OR Friday, you will attend a live lab session. You will work on lab case studies collaboratively with a small group of students. Each module will culminate in a summative assessment to be completed individually. There are no traditional exams for this course.
What's exciting about Biogeochemistry?
The Earth is an amazing network of "spheres", including the biosphere (all living organisms), atmosphere, geosphere (rocks), hydrosphere (oceans and freshwater systems), and cryosphere (ice). One of the universal traits of these spheres is that energy and materials (such as water and elements) flow through them, are processed by them, and are stored within them. Biogeochemistry is the study of these energy flows and material cycles between the living and nonliving world. It is a crucial science for helping us understand the Earth "system" and how it is being impacted by humanity.

Why is it critical for scientists and the general public to understand biogeochemistry? It's the fundamental basis for understanding many of the patterns we observe in nature, such as why plants are the most dominant terrestrial organisms on the planet, why deserts are located on the western side of continents and at 30 degrees north and south latitude, why bacteria and other microbes are the principal organisms that break down organic matter on Earth, and why plankton growth is so much greater in certain regions of the oceans than in others. It's important for understanding how Earth's major ecosystems function, including forests, wetlands, rivers, lakes, estuaries, and oceans. And it's critical for helping us understand many contemporary environmental challenges, including climate warming, ecosystems serving as carbon sinks and sources, food production, acid rain, and land use changes like clearcutting and wetland destruction.

What will I take away from this course?
- Explore and compare common ecosystems in Maine, from forests and agricultural lands to wetlands, lakes, rivers, and estuaries
- Learn how to use the general themes of energy flow and material cycling to compare major terrestrial and aquatic ecosystems
- Appreciate how biogeochemistry is a science that helps us understand linkages between the living world and its physical environment
- Understand the scientific basis of human alterations to the global earth system
- Learn, practice and evaluate methods for studying soils and water, from research-grade laboratory analyses to citizen science approaches that you can perform off-campus
- Conduct a multi-week study of terrestrial land uses in Maine
- Work with authentic data sets, with inherent real-world challenges
- Explore and engage in all stages of the scientific method by undertaking a multi-week research project on the impacts of climate warming on Arctic peatlands
- Critically read, discuss and synthesize peer-reviewed, scientific literature
- Write an original research project proposal and scientific paper
- Engage in learning communities of all sizes, from small groups to lab sections to the whole class
- Be welcomed into the EOS department and discipline by taking part in the first course required by all EOS majors
- Join the cohort of students interested in majoring in EOS

What will a typical week look like and what types of assignments will I have?
Each week, there will be three synchronous meetings; each of you will participate in two of them. The first meeting each week will be dedicated to class, which all students will attend. The second two meetings will be lab, with approximately half of the class in each section. You will have the opportunity to indicate which lab section is the best fit for your time zone and commitments outside of academics. The other lab section meeting time is available for you to use as you wish. Office hours will be offered outside of the three scheduled meeting times.
During our synchronous meeting times, we will focus on active discussions, synthesis, applied case studies, calculations, graphing and analysis. We will often engage in small group activities in breakout sessions and finish our meetings by reconvening in a larger class or lab group. Outside of class, you will have readings, videos, knowledge check “quizzes”, calculations and short assignments. The lab will culminate in a multi-week research project on Arctic peatlands for which you will occasionally work in small groups outside of our synchronous time block. Summative assessments for the course include graded quizzes (approximately 5) and a final group research paper.
What is “structural geology”?  
Structural geology is the study of deformation. When Earth scientists say “deformation,” we are referring to the changes in the shape, location, and/or orientation of a geologic material (rock, mineral) in response to stress. In this class, we will observe and measure evidence of deformation, interpret the mechanisms by which deformation occurred (including analysis of the types and magnitudes of different stresses that produced deformation), and explain the implications of deformation over geologic time and space. We will make observations and measurements at a variety of scales—from the microscopic to the plate-tectonic scale (and everything in between)—to derive an understanding of the evolution of structural features such as faults, folds, and fractures. As a result, you will develop widely applicable skills, such as spatial reasoning, problem solving, and communication. You will also develop discipline-specific skills (e.g., producing a geologic map, producing and interpreting geologic cross-sections, stress and strain analysis) and quantitative analysis skills (working with point cloud data, deriving and quantifying fault displacement in three dimensions, using GPS data to calculate and interpret modern strain for hazard and risk assessment). All of these skillsets are required to analyze geologic structures, evaluate their significance, and link structures to a tectonic framework.

What will we be doing in this class?  
- Identify structural features (faults, folds, fractures, etc.) from a variety of sources  
- Interpret the deformational history from the evidence preserved in a rock  
- Identify and plot structural features (as represented by planes and lines) in a 3-D reference frame  
- Interpret a geologic map  
- Produce a geologic map from data  
- Derive a cross-section to show the relationships among rock formations in the 3rd dimension  
- Use your knowledge of the spatial relationships among rocks (from maps and cross-sections) to evaluate regional prospects for economic deposits (e.g., gold, oil, gas, coal)  
- Quantify the conditions at which rocks fail—and what affects those parameters  
- Assess seismic hazards in key locations across the globe and evaluate potential impacts on society  
- Complete a short research project that involves a structural analysis of a region, a risk assessment for the region, and recommendations for how society can (or should) prepare for hazards

What might a typical synchronous class meeting look like?  
A typical synchronous class meeting might begin with your questions about the learning materials (readings, videos, papers) that were assigned, breakout rooms where you interpret diagrams, annotate photos, calculate failure criteria, plot data, and/or work on a short problem set in small groups, mini-presentations from these groups back to the class, small group work on the Challenge of the Day, short reflection, summary of key ideas, and a peek ahead at what’s next.
Quaternary Environments Fall 2020

What can I expect from a course on Quaternary Environments?

The past 2.6 million years of Earth’s history, known as the Quaternary, is uniquely characterized by intense and frequent swings in global climate. The record of both ‘Ice Ages’ and interglacial warming in Earth’s recent geologic past can be studied through many lenses of Earth science. In this course we will explore how sedimentology, geomorphology, and dating methods can be applied to reconstruct past environments associated with Quaternary climate shifts. Specific topics include Quaternary climate records and forcing mechanisms, basic glacial dynamics, isostasy and sea level changes, sediments, landforms, and dating methods. Students will complete a semester long project investigating the Quaternary record of a specific region of the world and will participate in several virtual field trips exploring the Quaternary record of New England. By the end of the semester you will be able to: (1) understand how to interpret past climatic environments from the geologic record by observing and contextualizing cryptic physical and chemical records, (2) read, evaluate, and discuss peer reviewed scientific literature within the context of course content, and (3) ask and investigate questions of and contextualize and communicate your understanding of Earth’s Quaternary history succinctly and professionally via visual, written, and verbal means.

How will Quaternary Environments be run as a remote course?

This course will be run under the ‘flipped classroom model’ meaning that lectures and field trip videos will be prerecorded and assigned as homework along with a reflection assignment and readings in preparation for synchronous class meetings. You will also have weekly ‘checkpoint’ assignments related to the semester long regional Quaternary history project. This course has been allotted two weekly time blocks one of which will be used for synchronous active learning activities and small group discussion related to lecture content and the other will be used for individual and group project meetings with the professor.
Geomorphology Fall 2020

What can I expect from a course in Geomorphology?

Geomorphology is study of Earth’s dynamic surface, it’s history, and the processes that shape it. Throughout the semester you will examine Earth’s landforms, landscapes, and how they change across a variety of timescales using both qualitative and quantitative methods. Particular emphasis will be placed on hydrology, rivers, hillslopes, and tectonic and climatic controls on landscape evolution. By the end of the semester you will be able to connect qualitative and quantitative data to interpretations of geomorphic processes and landscape evolution in the context of dynamic interactions among Earth’s spheres. You will also be able to ask, investigate, contextualize, and communicate the findings of geomorphic inquiry and their broader significance succinctly and professionally via visual, written, and verbal means.

How will Geomorphology be run as a remote course?

This course will be run under the ‘flipped classroom model’ meaning that lectures will be prerecorded and assigned as homework along with a reflection assignment and readings in preparation for synchronous class meetings. This course also includes a lab section which will be carried out as a combination of instructional videos, computer-based assignments, field trip videos, data analysis, group projects, writing assignments, and oral presentations. Each of the three weekly time blocks allotted to this course will generally be used for a different purpose, though the specific needs of the enrolled students will dictate exactly how this will look. Therefore, with some variability, you can expect that one block each week will be used for: (1) synchronous active learning activities and small group discussion related to lecture content, (2) synchronous discussion of the lab assignment and lab work time, and (3) individual and small group meetings with the professor. The great thing about Geomorphology is that landscapes are everywhere and having you all in different corners of the world will give the whole class a unique perspective this semester!
For remote learning, there will be synchronous activities during each time block (an hour or less during each block) knowing that not everyone will make all time blocks. This approach means that there may be some repetition between time blocks (to ensure critical content is distributed to everyone). Synchronous activities during time blocks will be like pillars supporting a bridge. Regular progress will be made crossing the bridge, but the pillars will be very close together so not all are required to hold up the bridge. The pillars/blocks will be fully documented so all students can look back and use that content as the class moves forward. Part of the course work will be for students to write summaries to share with their peers what happened in a given time block in addition to an array of prerecorded content, readings, homework, and group assignments. This class will make extensive use of group work to build community in a remote learning environment. This course will use the same open source, cloud-based collaboration tools that globally distributed teams of scientists and programmers use; group work will be supported by a powerful collaborative infrastructure that builds real-world skills. Please do not hesitate to contact Stefan Gary (sgary@bowdoin.edu) for more information about learning goals and course content.
For remote learning, there will be synchronous activities during each time block (an hour or less during each block) knowing that not everyone will make all time blocks. This approach means that there may be some repetition between time blocks (to ensure critical content is distributed to everyone). Synchronous activities during time blocks will be like pillars supporting a bridge. Regular progress will be made crossing the bridge, but the pillars will be very close together so not all are required to hold up the bridge. The pillars/blocks will be fully documented so all students can look back and use that content as the class moves forward. Part of the course work will be for students to write summaries to share with their peers what happened in a given time block in addition to an array of prerecorded content, readings, homework, and group assignments. This class will make extensive use of group work to build community in a remote learning environment. This course will use the same open source, cloud-based collaboration tools that globally distributed teams of scientists and programmers use; group work will be supported by a powerful collaborative infrastructure that builds real-world skills. Please do not hesitate to contact Stefan Gary (sgary@bowdoin.edu) for more information about learning goals and course content.
EOS 3515 Research in Paleoceanography

In Research in Paleoceanography students have the opportunity to carry out independent research projects in the topic of paleoceanography. In this course, upper level EOS students apply the research skills they have developed in their previous EOS courses to an in-depth semester long research project. The first few weeks of the course are focused on learning background of paleoceanographic concepts, methods, and proxies in order to effectively carry out a research project. This semester I am hoping to take advantage of our remote learning mode by involving students in research projects that I am actively working on in my lab— including an international collaborative research project that is focused on reconstructing the history of ocean acidification in the Gulf of Maine. This is an exciting new avenue of my own research program, and because it involves an international team of collaborators, the project is already being carried out remotely. I meet with my collaborators on Zoom, we send samples to each other’s’ labs, and we write papers and proposals together using shared documents online. This type of remote work is really how paleoceanography is done since experts are spread around the world. Thus, students in Research in Paleoceanography will have the opportunity to contribute to an authentic research experience alongside me and my collaborators. The exact format of the course will depend on enrollment, but I anticipate using a mix of synchronous class sessions and meetings during the time blocks, as well as asynchronous independent work and/or meetings with small research groups. Another unique opportunity that I am planning to offer this semester is the opportunity for all students in this course to co-author and co-present a virtual poster at the annual meeting of the American Geophysical Union (AGU), which will be held virtually this year. This is an international meeting of ~25,000+ geoscientists who typically gather in San Francisco for a week of scientific sessions, career development, science communication, policy workshops, and more. Since AGU has moved to a virtual format for 2020, all students will have the opportunity to attend. I will help students prepare and present at this meeting as part of the goals and expectations of this course. In addition, students will have the opportunity to not only interact with the paleoceanography community in our session as part of the course, but also participate in sessions and events throughout the entire week of the meeting. For more information on the meeting, see this link: https://www.agu.org/fall-meeting