Science and Math Recommendations for First-year Students

There are several environmental sciences (ES) classes that are appropriate for first-year students and we have put together some advice regarding these courses. As science faculty, we believe that courses in science and math represent a critical part of the curriculum at COA. We have reserved a lot of spaces for first-year students in a range of classes, and we feel like we will be able to give you some great choices. We also feel that it is important to develop interdisciplinary interests and sample broadly within our curriculum. Below are some suggestions for fall classes in science and math for incoming students. If you request a course and it is full, you will be put on a wait list for the class and you can still come to the first day of class and see if some room has appeared. In addition to the information given below, be sure to also read the full descriptions for these courses, which can be found on your student portal under Course Offerings or on the COA website at https://www.coa.edu/course-listings.htm.

**BIOLOGICAL SCIENCES**
The biology courses that are most appropriate for incoming students include:

- Marine Biology
- Ecology: Natural History
- Trees and Shrubs of Mount Desert Island
- Introductory Entomology
- Weed Ecology
- Biology: Form and Function

The first five courses are introductory courses that emphasize ecology and organismal diversity, but focus on different local habitats or a specific taxonomic or functional group on Mount Desert Island. *Ecology: Natural History* emphasizes time in the field, with two three-hour sessions a week. *Marine Biology* combines field trips, local natural history in the intertidal, and small group field projects and an overview of marine biology and policy with class lectures and discussions. The third course, *Trees and Shrubs* also has a large number of field trips with a focus on identification of local woody plants and local plant habitats. The fourth course, *Introductory Entomology*, focuses on identification, taxonomy, ecology and biology of insects. The fifth course, *Weed Ecology*, focuses on the biology of plants that flourish in disturbed habitats, and a substantial part of the course focuses on weeds in the college’s farms and gardens. If any of these courses fills and you do not get in, most of them are offered on a yearly basis, so you will have a chance for enrollment as a second-year student. Several of these courses give priority to first-year students, and other students have to get permission to take the class. The happens for marine biology, some of the sections of *Ecology: Natural History*, and for *Biology: Form and Function* discussed below. Our hope is that you will be able to hit the ground running at COA with some excellent introductory biology courses.

The last course on the list, *Biology: Form and Function*, offered in the fall, and its sister course, *Biology: Cellular Processes of Life*, offered in the winter, make up a foundational sequence in biology and they, or their equivalent, are prerequisites for many upper-level courses in the life
sciences. Form and Function focuses on the biology, ecology and evolution of organisms at the macro level (bodies, organs, tissues) while Cellular Processes of Life examines organisms at the cellular and subcellular level with an emphasis on genetics and cellular physiology. Some students take Cellular Processes of Life first, some Form and Function first. There are times that after talking with students that we jointly decide that the student has had adequate training and can skip one of these classes and start with more intermediate courses, we typically do that in the first term that a student is on campus. Although these two courses are largely designed to prepare students planning on pursuing work in the Life Sciences, we also find that students interested in topics within these broad areas also find these classes productive places to build on perspectives in areas as diverse as education, policy, psychology, and design.

We strongly recommend that you carefully read the course descriptions and contact your advisor if you have questions about how best to proceed with your choice of biology courses fall term. You can also contact any of the biology faculty with additional questions.

**PHYSICAL SCIENCES**

*Geology of Mt Desert Island (MDI)* is an introductory geoscience course with a strong field component. If you are interested in a field-based geoscience course, fall is a great term to take a course as the winter and spring geology courses are either not as field focused or are intermediate-level courses. The Geology of MDI course will focus on the various geological processes shaping the island from a deep time perspective resulting in the modern landforms, rock types, and watersheds we observe in this iconic setting today. We will also explore the connections between geological processes and the local human history (e.g. granite quarrying, water sources, cruise ships...). We will be in the field every week visiting sites in and around Acadia National Park. This class has several slots open for first-year students. If you do not get into this class, do not worry. There will be future opportunities for geology at COA.

A second geology course, *Rocks and Minerals*, focuses more on the identification of minerals and cover topics such as plate tectonics, geologic time, basic petrology and mineralogy, tools and instruments used for chemical and physical analysis, and natural resources related to rocks and minerals. By the end of the term, students will be able to relate a rock to its environment of formation, identify common rocks and minerals in hand sample, and relate the types and spatial distribution of rocks and minerals to the geologic history of Mt. Desert Island and Maine.

*Physics and Mathematics of Sustainable Energy* is a fast-paced introductory course designed to help students learn to do mathematical calculations and understand enough basic physics so that they can participate effectively in discussions of sustainable energy and efforts to reduce greenhouse gas emissions. Taking this course is particularly recommended for students interested in climate change and sustainability. This class makes use of algebra and some basic ideas from physics and chemistry, but there are no prerequisites. This class is offered every year.

*Physics I: Mechanics* covers mechanics: kinematics, forces and Newton's laws, conservation of energy and momentum. If you've had a good physics class before, you probably don't want to
take physics I -- it might not be challenging. On the other hand, you'll probably find that Physics I covers familiar topics in a different and (hopefully) interesting way. As such, you might still be interested in Physics I. Physics I is an excellent course for students who want to improve their quantitative problem solving skills and review algebra. It’s a great way to get lots of practice solving word problems. Physics I also serves as a pre-calc course of sorts; if you're uncertain of your algebra and trigonometry, taking Physics I can be a good way to improve your skills so you have an easier time with Calculus.

Chemistry: Organic Chemistry I is taught in the fall, but is only appropriate for students that have had AP or some form of first-year college introductory chemistry. The introductory Chemistry I/Chemistry II sequence will be offered in the Winter/Spring. This sequence will be foundational and necessary for more advanced studies in chemistry (Environmental Chemistry, Organic Chemistry, Green Chemistry, Bio Chemistry). It will be equally useful in the pursuit of many other STEM related fields (geology, biology, oceanography). Chemistry I/Chemistry II or AP/AB Chemistry will be required for more advanced chemistry courses such as Green Chemistry (offered Winter 2020) and Environmental Chemistry.

MATH, COMPUTER SCIENCE AND STATISTICS

We offer a large number of classes in statistics, computer sciences and mathematics. Most of these classes are being offered in the winter and spring. Two courses, Data Science 1 and Programming with Python 1 are being offered in the fall but have filled with upper classmen. In winter there will be an introductory statistics class: Introduction to Statistics and Research Design, and in spring we will offer the statistics class Advanced Analysis in Biology. In winter we will also offer Introduction to Chaos and Fractals and Differential Equations, an advanced math class for students that have already taken Calculus. Calculus is offered every other year and will be offered 20-21.

Additional information about math and physics at COA can be found on Dave Feldman’s webpage, and we encourage you to read more there if you are interested: http://hornacek.coa.edu/dave/Teaching/faq.html