Climate, Atmospheres + Oceans

Climate, atmospheres, and oceans are fascinating to study — and key to addressing ongoing and future challenges like climate change, air pollution, accurate weather prediction, and ocean deoxygenation and acidification. Atmosphere and ocean dynamics govern our day-to-day weather and the regional manifestations of climate change. Atmospheric chemistry allows us to understand air pollution, greenhouse budgets, and ozone depletion. Biology and chemistry shape the carbon and nutrient budgets of the planet. Understanding the evolution of ice sheets involves the dynamics of ice flow but also interactions with the ocean and atmosphere. Studies of past climates reveal the intricate nature of Earth's climate dynamics and inform our understanding of modern climate change. Students in this concentration area will learn about theory, observations and modeling while also engaging in hands-on activities such as analyzing weather and climate data or going sailing on an ocean cruise to collect new samples. Students who complete this concentration will develop an understanding of complex processes in the climate system, which can also inform the implications of new technologies and policies.

Where will your curiosity take you?

Learn how a major in Course 12 can help you build quantitative and analytical skills that will be important to your career after earning your degree at MIT.

» eaps.mit.edu

Course 12

EAPS Education Office 54-912 | 617-253-3381

Course 12 Major Requirements

INTRODUCTORY SUBJECTS

CHOOSE 36 UNITS

12.001	Introduction to Geology
12.002	Introduction to Geophysics and Planetary Science
12.003	Introduction to Atmosphere, Ocean, and Climate Dynamics
12.004	Introduction to Chemistry of Habitable Environments

PLUS

6 UNITS
AT LEAST 6 UNITS

12.TIP	Thesis Preparation
12.THU	Undergraduate Thesis *(at least 6 units, CI-M)*

LAB + FIELD

CHOOSE 12-15 UNITS

All are CI-M subjects.

12.115 + 12.116	Field Geology + Analysis of Geologic Data
12.307	Weather and Climate Laboratory
12.335	Experimental Atmospheric Chemistry
12.410J	Observational Techniques of Optical Astronomy

COMPUTATION

CHOOSE 12 UNITS

12.010	Computational Methods of Scientific Programming
12.012	MatLab, Statistics, Regression, Signal Processing
12.C25J	Real World Computation with Julia

6.100A		Introduction to Computer Science Programming in Python
PLUS	6.100B	Intro. to Computational Thinking and Data Science
-OR-	16.C20J	Intro. to Computational Science and Engineering

CONCENTRATION: CLIMATE, ATMOSPHERES, + OCEANS

36-39 UNITS TOTAL

REQUIRED FOR THIS CONCENTRATION

12.301		Climate Science
-OR-	12.318	Intro. to Atmospheric Data and Large-scale Dynamics

CHOOSE 24-27 UNITS

12.006J	Nonlinear Dynamics: Chaos
12.086	Modeling Environmental Complexity
12.300J	Global Change Science
12.306	Atmospheric Physics and Chemistry
12.314J	Ocean Chemistry Change Laboratory
12.315	Atmospheric Radiation and Convection
12.320AJ	Introduction to Hydrology and Water Resources
12.320BJ	Introduction to Hydrology Modeling
12.349	Mechanisms and Models of the Global Carbon Cycle
12.372	Elements of Modern Oceanography
12.373	Field Oceanography
12.377	History of Earth's Climate
12.390	Fluid Dynamics of the Atmosphere and Ocean
12.421	Physical Principles of Remote Sensing
12.422	Planetary Atmospheres

SUPPORTING SUBJECTS

CHOOSE 36 UNITS

RECOMMENDED FOR THIS CONCENTRATION

5.601 + 5.602	Thermodynamics I; Thermodynamics II and Kinetics
8.03	Physics III
18.03 -OR- 18.032	Differential Equations

For a complete list of supporting subjects, please visit » catalog.mit.edu