

OCEAN, EARTH AND ATMOSPHERIC SCIENCES GRADUATE MAJOR (MA, MS, PHD, MAIS)

Graduate Areas of Concentration

Atmospheric sciences, geological oceanography, geophysics, ocean ecology and biogeochemistry, physical oceanography

Ocean, Earth and Atmospheric Sciences (OEAS) is an interdisciplinary graduate major that first introduces students to the elements of the Earth system and the processes of mass and energy flow among them through a set of core/breadth courses:

Code	Title	Hours
OEAS 500	CASCADIA FIELD TRIP	3
OEAS 520	THE SOLID EARTH	4
OEAS 530	THE FLUID EARTH	4
OEAS 540	THE BIOGEOCHEMICAL EARTH	4

Students then pursue focused graduate course work and research in the following concentration areas, directed by their program committee.

OEAS Concentration Areas

Atmospheric Sciences

The atmospheric sciences are concerned with dynamics, physics and processes, including the interactions of the atmosphere with soil physics, hydrology and oceanic circulation. The atmospheric sciences concentration in the College of Earth, Ocean, and Atmospheric Sciences prepares students for careers in teaching and research through advanced study and participation in research projects directed by faculty members. MA, MS and PhD degrees are offered.

Applicants should have an undergraduate degree in physics, mathematics, engineering, chemistry or atmospheric science, with strength in mathematics. All applicants should have completed one year each of chemistry and physics with calculus, and courses in vector calculus and in differential equations.

Students perform thesis research on a wide range of problems including the study of global climate change, clouds and the earth's radiation budget, the structure and dynamics of turbulent flows, air-sea interaction, planetary atmospheres, the optimal use and economic value of weather and climate forecasts, and the study of acid rain and its effects on terrestrial ecosystems. In addition to theoretical, numerical, and observational methods of analysis, approximately one-fourth of the research projects either use or are developing methods for obtaining meteorological information from satellites.

Opportunities exist for PhD candidates to conduct some of their thesis research in Europe or at the National Center for Atmospheric Research. Most research projects involve collaboration with other scientists, either on the Oregon State University campus or at major domestic or international research centers.

Geophysics

Geophysics is concerned with physical processes within and on Earth, especially the internal physical constitution of the planet, and seismic, gravitational, geothermal, geoelectrical, geomagnetic phenomena and their relation to geological processes. The geophysics concentration offers graduate work toward MA, MS, and PhD degrees. Candidates should have an undergraduate degree in physics, mathematics, engineering, geology, or geophysics. Mathematics through differential equations is required and mathematical physics is desirable. Graduate Record Exam scores are required of all applicants. Opportunities for research exist on a wide range of geophysical problems in marine and continental regimes, emphasizing experimental, applied, and theoretical aspects.

Oceanography

Oceanography, the application of the sciences to the study of the oceans, is an interdisciplinary environmental science concerned with all processes: biological, chemical, geological, and physical, as well as the interactions between the ocean. The College of Earth, Ocean, and Atmospheric Sciences graduate major offers MA, MS, and PhD degrees with a concentration in oceanography.

For all areas in oceanography, applicants should have a strong quantitative background and an undergraduate degree in a relevant field of science or engineering and one year each of chemistry, physics, and calculus. Prior background in oceanography is not essential.

In geological oceanography (marine geology), a broad range of geological processes that influence the ocean is studied. Fields of interest include plate tectonics and the structure of the ocean basins, igneous petrology and geochemistry, paleoceanography and paleoclimatology, and coastal sedimentary processes. Candidates show strength in one or more of these fields: earth science, chemistry, physics, biology or mathematics.

Physical oceanography research covers the physical processes in the sea, exchange of energy and momentum at the air-sea interface, and the transmission and absorption of energy in the sea (e.g., light, heat, and sound). Circulation, tides, waves, heat content and density distributions are some of the other phenomena of particular interest. Candidates should have an undergraduate major in physics, mathematics, or engineering.

Contact Robert Allan, 541-737-1340, rallan@coas.oregonstate.edu, for more information.

Major Code: 5001