ATMOSPHERIC AND OCEANIC SCIENCES (ATOC)

About Atmospheric and Oceanic Sciences

The Department of Atmospheric and Oceanic Sciences offers, at the undergraduate level, a broad range of courses in atmospheric chemistry, atmospheric physics, meteorology, ocean and atmosphere dynamics, and climate. The study of atmospheric and oceanic sciences is based largely on physics and applied mathematics. All required courses except those at the introductory level generally have prerequisites or corequisites in physics, mathematics, and atmospheric science.

One of the goals of the discipline is to develop the understanding necessary to improve our ability to predict the weather. Another important area of study focuses on the changes in global and regional climate caused by the changing chemical composition of the atmosphere. The approach to the study of climate change is quantitative in the Department of Atmospheric and Oceanic Sciences. Like other physical sciences, atmospheric and oceanic sciences attempt to create theoretical models of their complex processes as a means of analyzing the motion and composition of the air, seawater, and sea ice; thermodynamic behaviours; and the interaction of the atmosphere and ocean with the other components of the climate system such as land and ice sheets.

From one viewpoint, the atmosphere and ocean may be studied as a large volume of gas or liquid by the methods of fluid mechanics: wind or currents, circulation patterns, turbulence, and energy and momentum exchanges are the ideas employed in this approach. Alternatively, the atmosphere and ocean may be studied from the point of view of their detailed physical processes: how water condenses in the air; how seawater freezes to form sea ice; how cloud droplets make rain; how sunlight warms the surface of the Earth; how heat is exchanged between the ocean and the atmosphere; and how the atmosphere and ocean interact to shape the weather and climate. A comprehensive understanding requires both viewpoints, and these are reflected in the curriculum.

Available Programs

- Atmospheric and Oceanic Sciences Liberal Program - Core Science Component (B.Sc.) (48 credits)
- Atmospheric Science and Physics Major (B.Sc.) (67 credits)
- Atmospheric Science Honours (B.Sc.) (75 credits)
- Atmospheric Science Major (B.Sc.) (62 credits)
- Atmospheric Science Minor (B.Sc.) (18 credits)
- Meteorology (Dip.) (30 credits)

Program Overview

The **Honours** program is meant for students with high standing. It is based on courses similar to those in the Major program, but includes a mandatory research course and provides many opportunities to take advanced courses. The **Major** program, although somewhat less intensive, provides solid foundations in atmospheric science.

Both the Honours and Major programs lead to a broad range of career opportunities in the public and private sectors (e.g. forecasting, renewable energy, reinsurance, environmental consulting) equip the student to undertake postgraduate study in atmospheric and oceanic sciences at any of the leading universities. The Department also offers a special one-year **Diploma in Meteorology** program to B.Sc. or B.Eng. graduates recognized by Environment and Climate Change Canada, allowing graduates to pursue a professional career as a meteorologist. Academic positions in teaching and research are available to M.Sc. and Ph.D. graduates.

Atmospheric and Oceanic Sciences (ATOC) Related Programs

Internship Year in Science (IYS)

IYS is a pregraduate work experience program available to eligible students and normally taken between their U2 and U3 years. For more information, see Science Internships and Field Studies and visit the Scientific Internship Program page.

The following programs are also available with an internship component:

- Major in Atmospheric Science
- Honours in Atmospheric Science

Earth System Science Interdepartmental Major

This program is offered by the Department of Atmospheric and Oceanic Sciences; Earth and Planetary Sciences; and Geography.

Students in the Department of Atmospheric and Oceanic Sciences interested in this program should contact Professor Bruno Tremblay (bruno.tremblay@mcgill.ca). For more information, see Earth System Science (ESYS).

Location

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