

SMR 411: Oceanography

Introduction

This course an undergraduate course is offered to both Meteorology students and Atmospheric Science students. While this course does not require pre-requisites, a basic knowledge on climate and atmospheric circulation will enable the learner to comprehend the concepts presented in the course.

Oceanography is the study of the physical, chemical, and biological aspects of the world ocean. All the global oceans together with the seas cover nearly three-quarters of the surface of the earth. The major goals of oceanography are to understand the geologic and geochemical processes involved in the evolution and alteration of the ocean and its basin, to evaluate the interaction of the ocean and the atmosphere so that greater knowledge of climatic variations can be attained, and to describe how the biological productivity in the sea is controlled.

Oceans play an important role on weather and climate. Have you ever heard of El Niño, tropical cyclones, the Atlantic hurricane season and storm surges? How does the oceans contribute to these phenomena? These and many other interesting features will be learnt in this course.

Why study oceanography?

There are three main reasons why we study oceanography

1. **We get food from the ocean.** Hence we may be interested in processes which influence the sea just as farmers are interested in the weather and climate. The ocean not only has weather such as temperature changes and currents, but the oceanic weather fertilizes the sea. The atmospheric weather seldom fertilizes fields except for the small amount of nitrogen fixed by lightning.
2. **We use the ocean.** We build structures on the shore or just offshore. We use the ocean for transport. We obtain oil and gas below the ocean. And, we use the ocean for recreation, swimming, boating, fishing, surfing, and diving. Hence we are interested in processes that influence these activities, especially waves, winds, currents, and temperature.
3. **The ocean influence the atmospheric weather and climate.** The ocean influence the distribution of rainfall, droughts, floods, regional climate, and the development of storms, hurricanes, and typhoons. Hence we are interested in air-sea interactions, especially the fluxes of heat and water across the sea surface, the transport of heat by the ocean, and the influence of the ocean on climate and weather patterns.

Course Objectives

At the end of this course you should be able to :

1. Describe the physical and chemical properties of the ocean
2. Discuss the various types of ocean circulation
3. State the factors that determine the state of the ocean
4. Describe the marine biological environment
5. Discuss the sources of marine pollution
6. Describe the characteristics of the various oceanic regions

7. State the importance of land-air-ocean interactions
8. Describe how oceanic observations is done
9. State the role played by the oceans in climate change
10. Describe the effect of the interaction between the ocean and the coastal area
11. Explain why there is need for integrated coastal management.