

PSC 201: Introduction to Physical Oceanography (4) Course Outline GE B5

Catalog Description:

Ocean origin, evolution, and sea floor features. Sediments; sea water; the ocean and our climate. Ocean surface and deep currents; waves and tides; coastal ocean. Marine life, food production, organisms, environments and lifestyles. Coastal development, pollution and food. Ocean resources and law. 4 lectures. Fulfills GE B5.

Learning Objectives:

Earth is a water planet, with oceans covering 70% of the Earth's surface. PSC 201 is an overview of ocean science for non-science students, emphasizing the physical, chemical, and geological aspects of the world's oceans. Some basic aspects of life in the ocean are considered, but this is not a class in marine biology. Several class meetings are devoted to understanding the role that oceans play in climate change and other environmental and social problems.

Upon completion of this course, the student should be able to:

- Describe how ocean basins were formed and how they have changed over time.
- Describe the major geological features of ocean basins.
- Describe the properties of sea water and explain where the salts come from.
- Describe how temperature, density, and salinity vary throughout the ocean.
- Understand the general circulation of the atmosphere and its role in Earth's climate.
- Understand the circulation of the oceans and its causes.
- Understand the properties and causes of waves and tides.
- Understand processes that affect coastal areas.
- Describe the processes at the base of the oceanic food web.
- Categorize important marine resources.
- Understand the role of the ocean in contemporary environmental issues.

Textbook:

Tom Garrison, *Oceanography: An Invitation to Marine Science*, 7th Edition, CENGAGE Learning or a similar textbook.

Content and Method:

Method: PSC 201 is taught in a lecture format.

Content: PSC 201 will generally cover the following topics. Approximately one week is spent on each topic.

- History and Tools of Oceanography
 - Geological history of the Earth and ocean basins
 - History of oceanography
 - Tools of oceanography
- Planet Earth
 - Earth's geological structure
 - Plate tectonics and continental drift
 - Seafloor spreading and subduction

- Ocean Basins
 - Ocean mountains and trenches
 - The ocean floor
 - Continental margins
- Sediments
 - Sedimentary materials
 - Sedimentary processes
 - Distribution of sediments
- Sea Water
 - Special properties of water
 - Salts and dissolved gases in ocean water
 - Variations of temperature, density, and salinity with latitude and with depth.
- Circulation of the Atmosphere
 - Large-scale circulation of the atmosphere
 - Role of the atmosphere in heat transport
 - Monsoons and hurricanes
- Circulation of the Ocean
 - Surface currents and oceanic gyres
 - Deep-water currents
 - El Niño and La Niña
- Waves and Tides
 - Properties of ocean waves
 - Tsunamis and other unusual waves
 - Tides
- Coasts
 - Erosion processes and sand transport
 - Beaches and barrier islands
 - Estuaries and bays
- Life in the Ocean
 - Nutrients and bioproductivity
 - The food web
 - Classes of marine organisms
- Ocean Resources and Law
 - Ocean energy
 - Mineral resources
 - Ocean law
- The Ocean and the Environment
 - Pollution
 - Habitat destruction and overfishing
 - Global warming

Methods of Assessment:

Assessment depends on the instructor but typically consists of quizzes, midterm exams, and a final exam. Some instructors may also require homework, a field trip, and/or a paper.