

**NVCC COLLEGE-WIDE COURSE CONTENT SUMMARY
GOL 111 - OCEANOGRAPHY I (4 CR.)**

Course Description

Examines the dynamics of the oceans and ocean basins. Applies the principles of physical, chemical, biological, and geological oceanography. Part I of II. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

General Course Purpose

The course covers an expanding and increasingly multidisciplinary field-study of the oceans. The student taking the course will obtain knowledge of a broad spectrum of scientific concepts and techniques and will be challenged to use them to solve wide-ranging problems. The course is best suited for the student who already has a background in one or more of the sciences and who is interested in pursuing a career in science. The course provides an opportunity for the student of diverse interest and viewpoints to come together with other students and share new experiences and expand their knowledge. Practical working experience in the laboratory and in the field, along the shore and on boats, will be emphasized. The student will learn to use sampling and measuring equipment and to collect process and identify water, sedimentary and biological specimens.

Course Prerequisites/Co-requisites

High school science courses (biology, earth science, chemistry, physics). The student's mathematical level is assumed to be two years of high school mathematics including algebra.

Course Objectives

Upon completion of the course, the student will be able to:

- trace in a general way the history of the oceans
- describe the operation of oceanic sampling devices
- interpret the record of biogeochemical changes in ancient oceans, i.e. paleoceanography
- discuss the biochemical and geological evidence for the origin of life in the oceans and generally trace the evolutionary history of life to the present time
- diagram the classification of main environments, labeling the major depth and water zones
- demonstrate techniques for sampling and processing marine organisms
- identify the major groups (kingdoms, phyla, classes) of marine organisms
- discuss the interactions among producers, consumers, and decomposers in the marine realm and tell how external environmental factors influence this system
- converse or write intelligently about food and mineral resources of the ocean, pollution problems, fisheries rights, coastal development power from the sea, and desalination

Major Topics to be Included

- A. Chemical Oceanography
 1. composition of sea water (major elements, nutrient elements, trace elements, gases)
 2. major chemical reactions
 3. factors affecting chemical reactions (concentrations, pH, organic processes)
 4. chemical cycles (nitrogen, phosphorus, carbon, oxygen)
- B. Physical Oceanography
 1. interrelationships of land-sea-atmosphere systems
 2. physical properties of sea water (H₂O molecule, phases, evaporation, condensation, freezing, light and sound transmission, heat, salinity, density, pressure, viscosity, surface tension)

3. motions of the sea (waves, breakers, tides, surface currents, deep currents, turbidity currents, Ekman transport, upwelling)

C. Geological Oceanography

1. model of earth's interior and crust
2. topography of ocean basin
3. structure of ocean basins
4. techniques for sampling ocean basins
5. mechanisms of sediment dispersal
6. patterns of sediment distribution
7. shoreline features
8. continental drift, sea floor spreading, plate tectonics
9. mineral resources of the oceans