

COURSE OUTLINE

Oceanography 115
Oceanography

Catalog Statement

OCEAN 115 is an introduction to the physical, chemical, and geological aspects of oceanography.

Total Lecture Units: 3.0

Total Laboratory Units: 0.0

Total Course Units: 3.0

Total Lecture Hours: 48.0

Total Laboratory Hours: 0.0

Total Laboratory Hours To Be Arranged: 0.0

Total Faculty Contact Hours: 48.0

Recommended preparation: Eligibility for ENGL 120 or ESL 151

Course Entry Expectations

Prior to enrolling in the course, the student should be able to:

- analyze short essays (at least five paragraphs in length) to identify thesis, topic development and concluding sentences, as well as traditional expressions used to increase coherence;
- evaluate compositions for unity, and sufficiency of development, and coherence;
- organize and write a thesis-driven, organized essay which is at least three paragraphs in length (paragraphs should have a topic sentence and at least five additional sentences which further develop that topic sentence with explanations and examples);
- use in their essays a variety of sentence types with minimal errors in such basics of the sentence as subject-verb agreement, subordination, and complementation.

Course Exit Standards

Upon successful completion of the required coursework, the student will be able to:

- understand and appreciate the processes which continue to shape the Earth, especially the oceanic physical environment;
- analyze global oceanographic problems from a geological perspective.

Course Content

Total Faculty Contact Hours = 48.0

Introduction (3 hours)

Importance of the Ocean

Disciplines of Oceanography

Early history of Oceanography

Applications of Oceanography

Distribution of Land and Water (3 hours)

- Internal structure of the earth
- Mass and distribution of the hydrosphere
- Distribution of the hydrosphere
- Longitude and latitude
- Pacific Ocean
- Atlantic Ocean
- Arctic Ocean
- Indian Ocean
- Marginal Seas
- Age and origin of seawater
- Sea level
- Oceanographic generalizations
- Deep Ocean Floor (**3 hours**)
 - Bathymetric techniques and charts
 - Hyposometric curve - elevations and depressions
 - Ocean bottom topography
 - Ocean basin features
- Sea Floor Spreading (**3 hours**)
 - Evidence for sea floor spreading
 - Plate tectonics
- Coral Reefs and Atolls (**2 hours**)
 - Darwin's theory of atoll formation
 - Guyots
 - Influence of Pleistocene glaciation
- Deep Sea Sediments (**3 hours**)
 - Methods of sampling
 - Classification of marine sediments
 - Turbidity currents
 - Mineral resources (petroleum, evaporites, metals)
- Water and its Properties (**4 hours**)
 - The polar bond
 - States of water
 - Latent heat of evaporation
 - Latent heat of melting
 - Polar ice
- Salt Water (**4 hours**)
 - The "living" soup
 - Chlorinity and salinity determination
 - Physical properties of seawater
 - Dissolved gases
 - Density and related stability of seawater
 - Sea ice formation
 - Resources from seawater
- The Open Ocean (**4 hours**)
 - Layered structure of the ocean
 - Light
 - Temperature
 - Salinity
 - Climatic regions of the ocean and land
- Ocean Currents (**4 hours**)

Surface currents

Forces causing currents (prevailing winds, Coriolis effect)

Ekman spiral

Upwelling and Downwelling

Geostrophic currents

Thermohaline circulation

Deep Ocean circulation

Origin and distribution of water masses

Waves and Tides (**4 hours**)

Ideal progressive waves (shallow water waves, deep water waves, wind waves, seismic sea waves)

Ideal stationary waves (equilibrium theory of tides, dynamic theory of tides, standing waves and tides)

Tides (types of tides, location of tide types, tidal currents)

Tsunamis

Internal waves

The Coastal Ocean (**4 hours**)

Physical characteristics

Salinity and temperature

Currents

Estuaries (estuarine circulation, types of estuaries, biologic productivity)

Shoreline and Shoreline Processes (**4 hours**)

Primary coast

Secondary coast

Beaches - a river of sand

Salt marshes

Longshore transport

Rip currents

Storm surges

Pollution

Marine Biology (**3 hours**)

The sun-primary energy source

Phytoplankton

Zooplankton

Benthos

Ecologic niches (rocky beaches, reef communities, deep ocean benthos)

Ocean productivity

Methods of Instruction

The following methods of instruction may be used in the course:

- lectures and in-class demonstrations;
- analysis of graphs, figures and data sets;
- instructor or student-led group discussion and peer-to-peer learning;
- media of appropriate content;
- computer-assisted learning and the internet;
- hands-on experiences of appropriate design;
- field trips.

Out of Class Assignments

The following out of class assignments may be used in the course:

- creation and analysis of graphs, figures, and data sets;
- online assignments;
- field trip reports;
- individual or group projects that create reports or other media.

Methods of Evaluation

The following methods of evaluation may be used in the course:

- instructor evaluation of attendance, participation in class, and participation in group work of any kind;
- evaluation of student work by peers;
- creation and analysis of graphs, figures, and data sets;
- tests, with at least one midterm exam and one final exam—exams including essay style or short answer questions are strongly encouraged;
- instructor evaluation of student-created reports or other media.

Textbooks

Garrison, Tom S., *Oceanography: An Invitation to Marine Science*. 9th ed, Cengage, 2016. Print and/or eText with or without MindTap online product.
12th Grade Reading Level. ISBN: 9781305710443 or 9781305710245

Garrison, Tom S. and Robert Ellis, *Essentials of Oceanography* 8th ed, Cengage, 2018. and/or eText with or without MindTap online product.
12th Grade Reading Level. ISBN: 9781337598521 or 9781337581509

Trujillo, Alan P. and Harold V. Thurman, *Essentials of Oceanography*. 12th ed, Pearson, 2017. Print and/or eText with or without MasteringOceanography online product.
12th Grade Reading Level. ISBN: 9780134113043 or 9780134298214 or 9780134298054

Student Learning Outcomes

Upon successful completion of the required coursework, the student will be able to:

- demonstrate understanding of the ocean as a major influence on weather and climate;
- demonstrate understanding of the physiography and formation of the ocean basins;
- demonstrate understanding of the factors that affect the coastal habitat.