



# ILLINOIS VALLEY COMMUNITY COLLEGE

## COURSE OUTLINE

**DIVISION: Natural Sciences & Business**

**COURSE: GEL 1006 Introduction to Oceanography**

Date: Spring 2022

Credit Hours: 3

*Complete all that apply or mark "None" where appropriate:*

Prerequisite(s): None

Enrollment by assessment or other measure?  Yes  No

If yes, please describe:

Corequisite(s): None

Pre- or Corequisite(s): None

Consent of Instructor:  Yes  No

Delivery Method:  **Lecture**                      **3 Contact Hours** (1 contact = 1 credit hour)  
 **Seminar**                              **0 Contact Hours** (1 contact = 1 credit hour)  
 **Lab**    **0 Contact Hours** (2-3 contact = 1 credit hour)  
 **Clinical**                                      **0 Contact Hours** (3 contact = 1 credit hour)  
 **Online**  
 **Blended**  
 **Virtual Class Meeting (VCM)**

Offered:  **Fall**     **Spring**     **Summer**

**CATALOG DESCRIPTION and IAI NUMBER (if applicable):**

The course focuses on the marine environment as a unique feature of the planet earth and investigates areas of intense scientific and public concern; the pervasiveness of the ocean and its effect on the earth's weather; its stunning physical size and diversity of contained life forms; its contributions to the physical and historical development of man; its impact on geopolitical and economic matters; the impact of oceanic pollutants and the potential exploitation of marine resources. IAI Equivalent: P1 905

## ACCREDITATION STATEMENTS AND COURSE NOTES:

None

## COURSE TOPICS AND CONTENT REQUIREMENTS:

1. Foundations of Oceanography  
Provides a description of the basic concepts of oceanography including scientific analysis and the history of ocean exploration and research. Provides a discussion on the features and use of charts and navigation.
  - A. Introduction to oceanography
  - B. Introduction to Scientific Investigation
  - C. Charts & navigation
  - D. Remote Sensing Imagery
  
2. Ocean Basins  
Provides a discussion of ocean basins, islands and coasts including their formation and evolution. Describes the origin and deposition of sediments.
  - A. Plate tectonics and the ocean floor.
  - B. Islands
  - C. Coasts
  - D. sediments
  
3. Ocean Processes  
Provides a discussion of processes that effect the ocean. Includes a discussion of the physical processes that move the water and the atmosphere
  - A. Waves
    - (1) Wind waves
    - (2) Tides
    - (3) Seiches and tsunamis
    - (4) Storm surges
  - B. Currents
  - C. Weather & Climate
  
4. Ocean Chemistry and Physics  
Provides a description of the physics and chemistry of ocean water. Includes a discussion of the physical and chemical properties of water and seawater and the effects of those properties on the ocean.
  - A. The water molecule
  - B. Thermal properties of water and seawater
  - C. Salinity and dissolved solids in seawater
  - D. Dissolved gasses in seawater
  - E. Light in seawater
  - F. Sound in seawater
  
5. Life in the Ocean  
Provides a description of the nature of life in the ocean. Includes a discussion of the development of life through time, adaptations to life in the ocean, and the properties of ecosystems.
  - A. Organic evolution through natural selection

- B. Ecosystems and ecosystem properties
  - C. Characteristics of life in the ocean
  - D. Major phyla of ocean life
6. Ocean Resources and Human Impact  
Provides a description of ocean resources and the nature and impact of human interactions with the ocean.
- A. Energy and mineral resources
  - B. Biological resources
  - C. Ocean pollution

### **INSTRUCTIONAL METHODS:**

1. Lectures
  - A. In class
  - B. On-line videos with slides
2. Discussions
  - A. In class
  - B. Asynchronous, web-based
  - C. May include individual oral presentations on specified topics
3. Audio-visual Aids - videos, podcasts, slides, charts, and maps
4. Supplemental Reading
  - A. Internet sites
  - B. Journals and periodicals
  - C. Newspapers
  - D. Books
  - E. Pamphlets and brochures

### **EVALUATION OF STUDENT ACHIEVEMENT:**

1. Regular attendance and participation in discussion
2. Written assignments
  - A. Homework
  - B. In class
3. Exams
4. Quizzes
5. Classroom Assessment (non grade-based)

### **INSTRUCTIONAL MATERIALS:**

#### **Textbooks**

- *Oceanography*, Garrison, T., (current edition)

#### **Resources**

- Links to appropriate internet sites provided in on-line course materials provided on course web site.

### **LEARNING OUTCOMES AND GOALS:**

#### **Institutional Learning Outcomes**

- 1) Communication – to communicate effectively;
- 2) Inquiry – to apply critical, logical, creative, aesthetic, or quantitative analytical reasoning to formulate a judgement or conclusion;

- 3) Social Consciousness – to understand what it means to be a socially conscious person, locally and globally;
- 4) Responsibility – to recognize how personal choices affect self and society.

### **Course Outcomes and Competencies**

1. Understand how science works and the characteristics of oceanography.
  - Competency 1.1: Identify the methodology of science.
  - Competency 1.2: Critically evaluate datasets and infer valid conclusions from those datasets.
  - Competency 1.3: Identify the basic concepts of oceanography as a method for the scientific study of the oceans.
  - Competency 1.4: Identify some of the key moments in the history of ocean exploration and study.
  - Competency 1.5: Identify some of the tools used by oceanographers and describe how they are used.
2. Understand the physical processes that shape the surface of the earth, and, specifically, the ocean basins and the coasts.
  - Competency 2.1: Describe the process of plate tectonics and the evidence that supports it.
  - Competency 2.2: Identify, analyze, and evaluate the features of the ocean produced by tectonic activity, and describe their origin and significance.
  - Competency 2.3: Describe the geological processes associated with waves and the coast and the landforms produced by those processes; analyze coastal landforms and describe the processes that created them.
  - Competency 2.4: Describe the geologic processes associated with the deep ocean and the landforms produced by those processes; analyze the ocean floor and describe the processes that shaped it.
  - Competency 2.5: Describe the process that produce ocean sediments, describe the abundance and locations of various types of sediments, classify sediments based on their characteristics.
3. Understand some of the current theories concerning the origin of the planet and the waters that cover its surface.
  - Competency 3.1: Describe and evaluate the scientific theories that explain the formation of the earth.
  - Competency 3.2: Describe and evaluate the scientific theories that explain the origin of the oceans.
  - Competency 3.3: Describe the solids and gasses dissolved in the ocean and explain their sources.
4. Understand the basic physical and chemical properties of the ocean in terms of the special properties of water, dissolved salts, and dissolved gases.
  - Competency 4.1: Describe the shape and polar nature of the water molecule, analyze and evaluate the effect this has on the physical and chemical properties of water.
  - Competency 4.2: Identify the densities of water and seawater, describe the factors that effect seawater density, and analyze and evaluate the effects of seawater density.
  - Competency 4.3: Identify the thermal properties of water and seawater and analyze and evaluate the effects of the thermal properties of water and seawater.

- Competency 4.4: Describe the factors that effect the salinity of seawater, analyze and evaluate the effects of seawater salinity.
- Competency 4.5: Describe the factors that effect light and sound in seawater.
5. Understand the motions of the seas--including currents, waves (wind, tides, seiches, and tsunamis), and storm surges.
- Competency 5.1: Identify, analyze, and evaluate the movement of water in a wave.
- Competency 5.2: Identify, analyze, and evaluate the causes of waves.
- Competency 5.3: Describe several methods for the classification of waves. (Including disturbing force, restoring force, and depth.)
- Competency 5.4: Identify, analyze, and evaluate the effects of waves.
- Competency 5.5: Identify, analyze, and evaluate the forces that create and effect the ocean's currents.
- Competency 5.6: Describe the different types of currents.
- Competency 5.7: Identify, analyze, and evaluate the effects of ocean currents.
6. Understand the basic concepts of weather and climate.
- Competency 6.1: Identify, analyze, and evaluate the forces that effect the earth's atmosphere.
- Competency 6.2: Identify, analyze, and evaluate basic weather patterns (including monsoons, tropical cyclones, and extra tropical cyclones).
- Competency 6.3: Identify, analyze, and evaluate the effects of the ocean on climate and weather.
7. Understand the basic nature of life in the ocean.
- Competency 7.1: Describe the evidence supporting the theory of the evolution of life through natural selection and analyze and evaluate the effects of evolution on life in the ocean.
- Competency 7.2: Describe, analyze, and evaluate the adaptations of organisms to life in the ocean.
- Competency 7.3: Describe, analyze and evaluate the distribution of life in the ocean.
- Competency 7.4: Identify the major phyla of life in the ocean and describe their features.
- Competency 7.5: Describe, analyze and evaluate ocean ecosystems and their properties.
- Competency 7.6: Describe, analyze and evaluate the movement of energy through ocean ecosystems and the factors that effect primary productivity.
8. Understand the resources of the sea in terms of minerals, energy, and food.
- Competency 8.1: Identify some of the biological resources of the sea and analyze and evaluate their origin, availability and use.
- Competency 8.2: Identify some of the energy resources of the sea and analyze and evaluate their origin, availability and use.
- Competency 8.3: Identify some of the mineral resources of the sea and analyze and evaluate their origin, availability and use.
9. Understand the interactions between humans and the ocean.
- Competency 9.1: Identify, analyze and evaluate the impact of humans on the ocean.
- Competency 9.2: Identify, analyze, and evaluate the causes of, effects of, and responses to marine pollution.