El Camino College

COURSE OUTLINE OF RECORD - Official

I. GENERAL COURSE INFORMATION

Subject and Number: Oceanography 10H
Descriptive Title: Honors Introduction to Oceanography

Course Disciplines: Earth Science

Division: Natural Sciences

Catalog Description: This honors course, intended for students in the Honors Transfer Program, presents the ocean in terms of its physical, chemical and biological environments. The topics include studies of: formation and modification of various wave types; tidal behavior; formation of water masses and ocean currents; beaches and changing shoreline; coral reefs; physical and chemical properties of ocean water; marine environments; marine sediments; origin of sea floor and coastline features; the spreading sea floor and drifting continents. This course is enriched through additional and more vigorous reading, writing, and research assignments.

Note: Students may take either Oceanography 10 or Oceanography 10H. Duplicate credit will not be awarded for Oceanography 10 and Oceanography 10H.

Conditions of Enrollment: **Recommended Preparation**
eligibility for English 1A

Course Length: [X] **Full Term** [ ] **Other (Specify number of weeks):**
Hours Lecture: **3.00 hours per week** [ ] **TBA**
Hours Laboratory: **3.00 hours per week** [ ] **TBA**
Course Units: **4.00**

Grading Method: **Letter**
Credit Status **Associate Degree Credit**

Transfer CSU: [X] **Effective Date: Proposed**
Transfer UC: [X] **Effective Date: Proposed**

General Education:
El Camino College: **1 – Natural Sciences**
Term: Fall 2016 Other:

CSU GE:

B1 - Physical Science

Term: Other:

B3 - Laboratory Sciences

Term: Other:

IGETC:

5A - Physical Science with Lab

Term: Other:

II. OUTCOMES AND OBJECTIVES

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

1. Basic Knowledge SLO: Students can identify the salient features of the basic concepts of oceanography. This includes the ability to recall the definitions of the specialized vocabulary of oceanography.
2. Student's Relationship with their Environment SLO: Students recognize and can accurately articulate how the ocean affects humans' lives and how human activities affect the ocean.
3. Nature of Science SLO: Students can identify the key elements of the scientific method in popular accounts of scientific research in magazines, newpapers, etc.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at http://www.elcamino.edu/academics/slo/.

B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

1. Explain the theory of plate tectonics and the formation and evolution of ocean basins through time and evaulate the data upon which the theory is based.

   Objective Exams
2. Analyze the chemical and physical principles involved in the changing characteristics of ocean water and how these properties affect the behavior and movement of seawater.

   Essay exams
3. Explain interactions between the ocean and atmosphere, including how the ocean affects climate and the impact of global warming on the ocean.

   Essay exams
4. Compare and contrast the formation of surface ocean currents and the circulation of deep ocean water in terms of wind forces, Coriolis effect, and thermohaline differences.

   Essay exams
5. Explain how various wave phenomenoa such as refraction, reflection, standing waves, wave dispersion, the formation of surf, and the formation of tsunamis affect the formation of waves on the ocean.

   Essay exams

6. Evaluate the formation of tides in terms of dynamic and equilibrium theories and the daily and monthly cycles of tides and why these cycles occur.

   Essay exams

7. Explain the origin of coastal features such as marine terraces, barrier islands, spits, and tombolos in terms of wave energy, tidal influx, and sediment dynamics.

   Essay exams

8. Explain the origin and movement of marine sediments through the oceanic environment and explain the chemical and biological factors involved in the deposition and modification of sediments.

   Essay exams

9. Analyze the nature and distribution of productivity within the marine environment and the movement of energy through higher trophic levels.

   Essay exams

10. Compare and contrast the adaptations of organisms within different marine environments in terms of their response to physical and chemical factors.

    Essay exams

11. Interpret nautical charts, bathymetric maps and profiles.

    Objective Exams

12. Perform dimensional analysis calculations and calculate percent, area, and volume.

    Written homework

13. Prepare and analyze graphs, including time-series graphs, histograms, multivariate graphs, scatter plots, and pie charts.

    Laboratory reports

14. Utilize the scientific method to assemble a logical chain of reasoning from observation to inference.

    Essay exams

15. Conduct scholarly research independently to enrich multiple reading and writing tasks. Portions of the course require students to effectively conduct self-directed studies of the material. Demonstrate the ability to conduct independent, self-directed research using appropriate published and/or internet sources to complete assignments or projects.

    Other (specify)

    Research paper

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lecture	5	I	Introduction to the Earth and Oceans A. History of Oceanography B. The Scientific Method C. Theories of the Formation of the Universe, the Solar System, the Atmosphere, and the Ocean
Lecture	5	II	Plate Tectonics A. Interior of the Earth B. Data Supporting the Theory and the Development of the Theory

			C. Plate Boundaries and Motion 1. Convergent Boundaries 2. Divergent Boundaries 3. Transform Boundaries
Lecture	3	III	Sediments A. Kinds of Sediments: Lithogenous, Biogenous, and Hydrogenous B. Sources and Movement
Lecture	4	IV	Ocean Water A. The Chemical and Physical Properties of Water B. The Chemical and Physical Properties of Seawater
Lecture	6	V	Ocean-Atmosphere Interactions A. Climate Zones B. Atmospheric Circulation C. Hurricanes D. The Greenhouse Effect and Global Warming
Lecture	5	VI	Ocean Circulation A. Wind-driven Surface Currents B. Geostrophic Currents C. Thermohaline Circulation D. El Nino
Lecture	4	VII	Waves A. Growth of Waves and Surf B. Interference C. Dispersion D. Refraction E. Reflection F. Tsunami G. Storm Surge
Lecture	3	VIII	Tides A. Daily and Monthly Cycles B. Equilibrium Theory of the Tides C. Dynamic Theory of the Tides D. Seiches
Lecture	6	IX	Coastlines A. Depositional and Erosional B. Emergent and Submergent C. Coastal Water Bodies and Circulation
Lecture	6	X	Human Impacts on the Ocean A. Resources (Extraction) B. Pollution C. Overfishing
Lecture	6	XI	Productivity of and Energy Flow through Marine Environments A. Spatial and Temporal Distribution and Variation of Productivity B. Controls of Productivity C. The Flow of Energy through Different Ecosystems (intertidal, open ocean, deep-sea, coral reefs, kelp forests) D. Organisms Adaptations to the Physical and Chemical Conditions in Different Ocean Ecosystems
Lecture	1	XII	Research Paper Writing A. Source material from scholarly sources B. Organization using note cards and outline C. Citiations and works cited
Lab	54	XIII	Laboratory Topics

			A. Map Skills B. Contour Maps C. Plate Tectonics D. Sediments E. Sedimentary Rocks F. Water and Seawater Chemistry G. Climate Changes H. Ocean Currents I. Waves J. Tsunamis K. Tides L. Shorelines M. Remote Sensing N. Primary Productivity O. Coral Reefs P. Rocky Shoreline Alternate Site Meeting Q. Sandy Shoreline Alternate Site Meeting R. Pier Alternate Site Meeting S. Cabrillo Aquarium Alternate Site Meeting
Total Lecture Hours	54		
Total Laboratory Hours	54		
Total Hours	108		

IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

A. **PRIMARY METHOD OF EVALUATION:**

Substantial writing assignments

B. **TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:**

After reading the chapter on plate tectonics, write a one-page description of the development of the theory of seafloor spreading. Include specific examples of evidence that supports the theory.

C. **COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:**

1. In a one-page essay, describe how the construction of coastal engineering structures like groins, seawalls, etc. affect the coastline, and explain how and why they alter the coastline. Use at least one scholarly source from a research journal and use citations after quotes.
2. Suppose that there was no Moon. How would the tides be different? In other words, would high tides be higher or not as high? Would low tides be lower or not as low? Would the sea level change from high tide to low tide more frequently or less frequently? How often would spring and neap tide conditions occur? Respond in a two-page essay that explains your reasoning.

D. **OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:**

Essay exams

Quizzes

Reading reports

Written homework

Laboratory reports

Field work

Homework Problems

Term or other papers

Multiple Choice

Completion

Matching Items

True/False

Other (specify):

Research paper

V. INSTRUCTIONAL METHODS

Demonstration
Discussion
Group Activities
Laboratory
Lecture
Multimedia presentations
Other (please specify)

Alternate Site Meetings: Aquarium Visit, Cruise, Measurements from a Pier, Rocky Shoreline, Sandy Shoreline

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS

Study
Answer questions
Required reading
Problem solving activities
Written work
Observation of or participation in an activity related to course content

Other (specify)
Research paper using multiple scholarly research journal sources

Estimated Independent Study Hours per Week: 6

VII. TEXTS AND MATERIALS

A. **UP-TO-DATE REPRESENTATIVE TEXTBOOKS**
Thurman and Trujillo. Essentials of Oceanography. 11th ed. Prentice Hall, 2014.
Earth Science Faculty. Exploring Southern California Oceanography Laboratory Manual. ECC Bookstore, 2013.

B. **ALTERNATIVE TEXTBOOKS**

C. **REQUIRED SUPPLEMENTARY READINGS**

D. **OTHER REQUIRED MATERIALS**

VIII. CONDITIONS OF ENROLLMENT

A. Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	Category and Justification

B. Requisite Skills

Requisite Skills

C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification
Non-Course Recommended Preparation eligibility for English 1A	It is advised that students be able to read and effectively analyze college level texts, and be able to write a paper that persuasively proves an original thesis. If students are eligible for English 1A they are more likely to be successful in this course.

D. Recommended Skills

Recommended Skills
There are sufficient reading requirements that the student be at a college level of reading and writing. ENGL A - Read and apply critical thinking skills to college-level expository prose for the purposes of writing and discussion.ENGL 84 - Utilize comprehension and vocabulary strategies to improve reading rate. ENGL 84 - Interpret a book-length work through discussion, journal writing, or composition writing.

E. Enrollment Limitations

Enrollment Limitations and Category	Enrollment Limitations Impact

Course created by Joseph Holliday on 04/03/2015.

BOARD APPROVAL DATE: 10/19/2015

LAST BOARD APPROVAL DATE:

Last Reviewed and/or Revised by Joseph Holliday on 04/03/2015

19018