

## **ORE 603 Oceanography for Ocean Engineers**

### Designation

Core Course

### Catalog Description

Physical, chemical, biological and geological ocean environments for ocean engineers. Introduction to ocean dynamical processes and general circulation. Ocean measurement techniques, theory of underwater acoustics. Sonar, swath bathymetry, and tomography applications. Pre: consent.

### Prerequisites by Topics

Differential equations

Fluid mechanics

### Textbooks

None

### Reference books

1. *Ocean Circulation*, The Open University Press, 2001.
2. *Oceanography: An Invitation to Marine Science*, T. Garrison, Brooks / Cole 2002.
3. *The Ocean Basins: Their Structure and Evolution*, The Open University Press, 2001.
4. *Descriptive Physical Oceanography: An Introduction*, G.L. Pickard and W.J. Emery, Butterworth-Heinemann, 1990.
5. *Introductory Dynamical Oceanography*, S. Pond and G.L. Pickard, Butterworth-Heinemann, 1993.

### Course Objectives

To provide the ocean engineering student with an understanding of the ocean environment. The course will provide an overview of the physical, chemical, biological and geological processes that determine the state of the ocean and its dynamics. Topics of discussion will include description of the world's oceans and dynamic processes, introduction to analytical description, circulation and ocean measurement techniques. Theory of underwater acoustics will be examined along with sonar, swath bathymetry and tomography applications.

### Topics Covered

1. Ocean Basins and Margins
2. Properties of Water / Sea Water Chemistry
3. Water, Salt and Heat Balance
4. Physical Laws and Equations of Motion
5. Effects of Rotation
6. Atmospheric Circulation
7. Ocean Circulation
8. Coastal Oceanography
9. Biological Oceanography
10. Instruments and Methods
11. Underwater Acoustics

Assessment

Midterm 25%

Final 30%

Course Project 20%

Homework 20%

Usage of Engineering Tools and Computers

Matlab

Schedule

Two 1.25-hour sessions per week.

Contribution to Professional Component

Engineering Science: 3 credits

Relationship to Program Outcomes

Program Outcome 2: Basic science, mathematics, & engineering

Program Outcome 3: Ocean engineering core

Program Outcome 5: Use of latest tools in ocean engineering

Program Outcome 6: Problem formulation & solution

Prepared by

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