

1. Department, Course Number, Title

ORE 664, Nearshore Processes and Sediment Transport

2. Designation as a Required or Elective Course

Coastal Engineering Required Course

3. Course Catalog Description

Sediment transport by waves and currents in coastal areas and its effect on morphological processes. Effect of man-made structures on littoral drift and shoreline. Pre: 607 or consent.

4. Prerequisites

Differential equations

Fluid mechanics

Wave mechanics

5. Textbooks and/or Other Reading Material

Textbook: None

Reference books:

1. Beach Processes and Sedimentation, P.D. Komar, 2nd Edition, Prentice-Hall, Inc., 1998
2. Coastal Bottom Boundary Layers and Sediment Transport, Advanced Series on Ocean Engineering, Vol. 4, P. Nielsen, World Scientific, 1992
3. Coastal Engineering Manual, Army Corps of Engineers, 2002; online at [bigfoot.wes.army.mil/cem001.html](http://bigfoot.wes.army.mil/cem001.html)

6. ABET Course Learning Outcomes

(Course objectives) The aim of the course is to provide engineers working in the coastal environment with the understanding of wave and sediment processes and their effects on the morphology of beaches and coastlines. We will explore the dynamics of the nearshore environment in detail, including consideration of wave boundary layer processes and sediment particle dynamics and examine how these can be considered using engineering models.

7. Topics Covered

1. Coastal Morphology
2. Fluid Dynamics and Wave Theory Review
3. Nearshore Currents
4. Boundary Layer Dynamics
5. Sediment Dynamics
6. Cross-shore Transport
7. Longshore Transport
8. Sediment Transport Models
9. Nearshore Morphodynamics

8. Class/laboratory schedule

Two 1.25-hour sessions per week.

9. Contribution of Course to Meeting the Requirements of Criterion 5

Assessment

Class Participation 10%

Final Exam 30%

Homework Projects 30%

Lab Project 30%

Usage of Engineering Tools and Computers

Matlab, acoustic and image based velocity measurement, image processing

Contribution to Professional Component

Engineering Science: 2 credits

Engineering Design: 1 credit

10. Relationship to Program Outcomes

Program Outcome 2: Basic science, math, & engineering

Program Outcome 5: Use of latest tools in ocean engineering

Program Outcome 6: Problem formulation & solution

11. Prepared by and date of preparation

G. Pawlak, Spring 2009