

ORE 630 Structural Analysis in Ocean Engineering

Designation

Offshore Engineering Required Course

Catalog Description

Structural and finite element analyses, and design of ocean structures to withstand hydrostatic and hydrodynamic loading of the sea. Considerations include material type, safety factor, stress concentration, and fatigue. Pre: consent.

Prerequisites by Topics

Calculus and algebra

differential equations

Numerical methods

Solid mechanics

Textbook

Hartley Grandin, Jr., *Fundamentals of the Finite Element Method*, Waveland Press, Inc.

Reference Books

None

Course Objectives

To familiarize students with structural analysis, finite element analysis, and their application in ocean structure design.

Topics Covered

1. Matrix analysis of structures.
2. Finite element method. One-dimensional element, constant-strain triangle,
3. isoparametric 3-node and 4-node elements, numerical integration.
4. Introduction to ANSYS.
5. Design of Ocean Structures. Design process, project planning, materials selection,
6. economic analysis, ethics, and finite element analysis.

Assessment

8 Assignments

1 midterm

1 final exam

1 final project

Usage of Engineering Tools and Computers

ANSYS

Schedule

Three 50-minute sessions per week.

Contribution to Professional Component

Engineering Science: 1 credit

Engineering Design: 2 credits

Relationship to Program Outcomes

Program Outcome 2: Basic science, mathematics, & engineering

Program Outcome 4: Ocean engineering specialization

Program Outcome 5: Use of latest tools in ocean engineering

Program Outcome 6: Problem formulation & solution

Program Outcome 7: Design & optimization in ocean engineering

Program Outcome 9: Professional issues

Prepared by

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