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

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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