

ORE 677 OTEC Systems

Designation

Ocean Resources Engineering Required Course

Catalog Description

Ocean thermal energy conversion (OTEC) systems, thermodynamics, alternative processes, co-products, and environmental context. Pre: ME 311 or equivalent.

Textbook

None

Reference books

1. *Renewable Energy from the Ocean – a Guide to OTEC*, William H. Avery and Chih Wu, Oxford University Press, 1994.
2. *Ocean Energy Recovery*, Hans Krock, ASCE, 1990.

Course Objectives

To familiarize students with the systems engineering approach to the design of a multi-product OTEC system for tropical island and offshore OTEC/hydrogen production platforms.

Topics Covered

1. Solar energy flux and the ocean thermal resource
2. Historical context of OTEC
3. Systems engineering
4. Thermodynamics and alternative power cycles.
5. Design of pipes, pumps, heat exchangers, turbines, generators.
6. Gas exchange dynamics.
7. Fresh water production, air conditioning, ice, aquaculture, agriculture.
8. Hydrogen production, storage and transport.
9. Economics, social context, politics.
10. Future developments.

Assessment

3 exams (60%)

Engineering report (40%)

Usage of Engineering Tool and Computers

Computer use required for engineering report for data and word processing.

Schedule

Two 1.25-hour 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 6: Problem formulation & solution

Program Outcome 7: Design & optimization in ocean engineering

Program Outcome 9: Professional issues

Prepared by

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