

1. Course Number and Title  
ORE 677 Marine Renewable Energy
2. Credits and Hours  
3 credits, two 1.25-hour sessions per week
3. Instructor  
G rard C. Nihous
4. Textbooks  
Textbook: none  
Reference books:
  - a. Renewable Energy from the Ocean – a Guide to OTEC, W.H. Avery and C. Wu, Oxford University Press, 1994.
  - b. Ocean Wave Energy – Current Status and Future Perspectives, J. Cruz (ed.), Springer, 2008.
  - c. Wind Energy Explained – Theory, Design and Application, J.F. Manwell, J.G. McGowan, A.I. Rogers, Wiley & Sons, 2004.
  - d. Sustainable Energy – without the hot air, D.J.C. MacKay, <http://www.withouthotair.com>, 2008.
5. Course Information
  - a. Course contents: Ocean thermal energy conversion (OTEC) systems: applicability, thermodynamics, design challenges; wave energy converters: floating devices, oscillating water column, optimal hydrodynamic performance; current, tidal and offshore wind power.
  - b. Prerequisite: Water Waves Mechanics; knowledge of Thermodynamics desirable
  - c. Designation as a required or elective course: Ocean Resources Engineering required course
6. Course Goals
  - a. Instruction Outcomes:
    - i. An understanding of the principles and applicability of OTEC systems.
    - ii. An understanding of the design principles and engineering criteria to develop functional and efficient electrical power generation from wave, wind, current and tidal resources.
    - iii. An understanding of the role of ocean renewable energy within the current worldwide framework of energy production.
7. Topics Covered
  - a. Economic, social and political context of energy production.
  - b. Estimation of the OTEC resource.
  - c. Thermodynamics of basic OTEC cycles.
  - d. Design of pipes, pumps, heat exchangers, turbines, generators.
  - e. Floating wave energy converters and oscillating water columns.
  - f. Optimal hydrodynamic performance.
  - g. Design principles and constraints.
  - h. Current, tidal and wind power production.