# OCN 631 - Ocean Minerals

**T/Th • 12:00n-1:15pm • MSB 305 • Spring 2012**

## SYLLABUS*

<table>
<thead>
<tr>
<th>Instructors:</th>
<th>Dr. John C. Wiltshire</th>
<th><a href="mailto:johnw@soest.hawaii.edu">johnw@soest.hawaii.edu</a></th>
<th>Ph: 956-6042, MSB 319 (ofc hrs - by appt)</th>
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<td></td>
<td>Dr. Gary M. McMurtry</td>
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| JAN  | 10  | Course organizational meeting | John Wiltshire |
|      | 12  | Intro to Marine Minerals      | John Wiltshire |
|      | 17  | Overview of Global Energy - Part I | John Wiltshire |
|      | 19  | Overview of Global Energy - Part II | John Wiltshire |
|      | 24  | Manganese Nodules             | John Wiltshire |
|      | 26  | Deep Sea Mining Technology    | John Wiltshire |
|      | 31  | Peak Everything - Part I      | Gary McMurtry |

| FEB  | 2   | Peak Everything - Part II - Running out of Commodities | Gary McMurtry |
|      | 7   | Formation Processes of Polymetallic Sulfides (PMS) on the Ocean Floor: Geology of the Smoker and PMS | Gary McMurtry |
|      | 9   | Chemistry of Hydrothermal Vents and Polymetallic Sulfides | Gary McMurtry |
|      | 14  | **Student 1 seminar - Shetelig, Haakon** | **Advances in offshore oil production, innovations from pipe to platform design** |
|      | 16  | **Student 2 seminar - Henningsgaard, Sondre** | **ROVs (remotely operated vehicles)** |
|      | 21  | **Student 3 seminar - Laugen, Lars** | *(Gary McMurtry)*  
|      |     | **AUV’s (Autonomous Underwater Vehicles) and new exploration technologies** |
|      | 23  | **Student 4 seminar - Schreiber, Charla** | *(Gary McMurtry)*  
|      |     | **Waste disposal at sea** |
|      | 28  | **Student 5 seminar - Komar, Nemanja** | **Carbon dioxide sequestration** |

| MAR  | 1   | Legal and Economic Aspects of Marine Minerals | John Wiltshire |
|      | 6   | Financial Structuring of Minerals Projects   | John Wiltshire |
|      | 8   | PMS Deposits: From Smoker to an Ore Body     | Gary McMurtry |
|      | 13  | Case Studies on the Ocean Floor: The Red Sea | Gary McMurtry |

*Subject to change without notice*
MAR 15
Thurs
Student 1 seminar - Shetelig, Haakon
Fossil fuel alternatives - tar sands, oil shale

20
Student 2 seminar - Henningsgaard, Sondre
Natural Gas – new sources of gas, gas to liquids and the gas market
(Gary McMurtry)

22
Student 3 seminar - Laugen, Lars
Oil spills

Mar 26-30
 PRINCE KUHIO DAY (MON) + SPRING BREAK

APR 3
Student 4 seminar - Schreiber, Charla
Biofuels, bio diesel from plankton (ocean-based biofuels)

5
Student 5 seminar - Komar, Nemanja
Desalination, advances in Reverse Osmosis technology

10 Field trip to Makai Research Pier, HURL Submersible Ops, Makapu'u Point (Waimanalo)
John Wiltshire

12 Resource and mining aspects of deep-sea polymetallic sulfides
Gary McMurtry

17
Student 1 seminar - Shetelig, Haakon

19
Student 2 seminar - Henningsgaard, Sondre

24
Student 3 seminar - Laugen, Lars

26
Student 4 seminar - Schreiber, Charla

MAY 1
Student 5 seminar - Komar, Nemanja
Wrap up
Gary McMurtry

(Last day of instruction for ALL classes is Wed, May 2, 2012)

Grading: Seminar #1 - 20%, Write -up 20%
Seminar #2 - 20%, Write -up 20%
Seminar #3 - 15%, Class Participation 5%
No written Final Exam

Student Learning Outcomes (SLOs)
This course familiarizes students with the mineral resources of the ocean and the engineering challenges faced to exploit them. Specific course learning outcomes include:
1. Ability to formulate the design issues involved in underwater mining equipment.
2. Understanding of the range and type of ocean mineral deposits.
3. Ability to articulate the environmental, economic and energy issues involved in ocean mineral development.

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Rev. 2/28/2012