ORE 678 - Marine Mineral Resources Engineering
OCN 631 - **Ocean Minerals**

T/Th ◆ 12:00n-1:15pm ◆ MSB 305 ◆ Spring 2013

SYLLABUS*

Instructors:	Dr. John C. Wiltshire	johnw@soest.hawaii.edu	Ph: 956-6042, MSB 319 (ofc hrs - by appt)
	Dr. Gary M. McMurtry	garym@soest.hawaii.edu	Ph: 956-6858, MSB 325 (ofc hrs - by appt)

JAN	8	Course organizational meeting	John Wiltshire
	10	Intro to Marine Minerals	John Wiltshire
	15	Peak Everything - Part I	Gary McMurtry
	17	Peak Everything - Part II - Running out of Commodities	Gary McMurtry
	22	Formation Processes of Polymetallic Sulfides (PMS) on the Ocean Floor: Geology of the Smoker and PMS	Gary McMurtry
	24	Chemistry of Hydrothermal Vents and Polymetallic Sulfides	Gary McMurtry
	29	Manganese Nodules	John Wiltshire
	31	Deep Sea Mining Technology	John Wiltshire
FEB	5	Economic Aspects of marine Minerals	John Wiltshire
	7	Financial Structuring of Minerals Projects	John Wiltshire
	12	Student 1 seminar - ***Coral Reef Rehabilitation***	**Austin Barnes**
	14	Student 2 seminar - ***Biofuels***	**Ame Arakaki**
	19	Student 3 seminar - ***Sand, Sand Mining & Beach Replenishment***	**Michael Frederick**
	21	Student 4 seminar - ***Methane Hydrates***	**Luis Dasilveira**
	26	PMS Deposits: From Smoker to an Ore Body	Gary McMurtry
	28	Case Studies on the Ocean Floor: The Red Sea	Gary McMurtry
MAR	5	Resource and mining aspects of deep-sea polymetallic sulfides	Gary McMurtry
	7	*TBD*	Gary McMurtry

CONTINUED on REVERSE

** Subject to change without notice*

MAR	12	**Student 1 seminar - *Waste Disposal at Sea***	**Austin Barnes**
	14	**Student 2 seminar - *The Hydrogen Economy***	**Ame Arakaki**
	19	**Student 3 seminar - *Energy Storage***	**Michael Frederick**
	21	**Student 4 seminar - *Fuel Cell Technology***	**Luis Dasilveira**
Mar 25-29		 ***PRINCE KUHIO DAY (TUES), SPRING BREAK, & GOOD FRIDAY*** 	
APR	2	Energy I	John Wiltshire
	4	Field trip to Makai Research Pier, HURL Submersible Ops, Makapu'u Point (Waimanalo)	John Wiltshire
	9	Energy II	John Wiltshire
	11	**Guest presentation - *Nuclear Power***	**Dr. James DeLuze**
	16	**Student 1 seminar - *Carbon Emission Trading (tentative)***	**Austin Barnes**
	18	**Student 2 seminar - *Desalination***	**Ame Arakaki**
	23	**Student 3 seminar - *Carbon Dioxide Sequestration***	**Michael Frederick**
	25	**Student 4 seminar -** *TBD*	**Luis Dasilveira**
	30	Wrap Up (Last day of instruction for ALL classes is Wed, May 1, 2013)	Team

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. An 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