Deep-Sea Biology (OCN630) - Syllabus
Fall 2011
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T TH 9:00-10:15
MSB305
Syllabus schedule subject to change

Course Goals – The deep sea is the largest living space on the planet. Its inhabitants are varied and its communities are often complex, adapted to the particular characteristics of their habitat. This course will cover the major topics in the field, such as benthic-pelagic coupling, depth zonation, energetics, diversity, ecosystem function, adaptations, and the ecology of major habitats. The last portion of the course will deal with anthropogenic threats such as deep-sea fisheries, mining and global climate change. Its goal is to provide you with a basic understanding of what we know (and don’t know) about the biology, ecology and biodiversity of deep-sea ecosystems, the methods used in the field, and it will create a forum for discussion of the major current questions and recent exciting discoveries.

Course Structure – After each lecture (or pair of lectures) students will lead a discussion session. The lectures will present the basics of the topics. The discussions will be based on assigned readings (primarily current scientific papers), allowing the class to explore the controversies, implications of recent findings, and highlight future directions for research.

Student Learning Outcomes – At the end of this course you will be able to:

1) Describe the co-varying effects of temperature, pressure, oxygen and light levels on the adaptations of deep-sea organisms.
2) Evaluate the influence of variables co-varying with depth on communities, populations, and species.
3) Discuss the various sources of energy available to deep-sea organisms and their controls on community processes.
4) Compare and contrast various deep-sea habitats and their faunas.
5) Evaluate the potential impacts of anthropogenic activities on deep-sea communities.
6) Read and understand a scientific paper, evaluate its findings and discuss the implications of those findings.
7) Synthesize a body of literature on a topic and communicate a clear synopsis of the background, controversies, and future directions for research orally.

Reading/Texts –

In addition readings will be assigned each week from the scientific literature.

Office hours – By appointment.
<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture topic</th>
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<tbody>
<tr>
<td><strong>Introduction</strong></td>
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<tr>
<td>Aug 23</td>
<td>The physical environment and history of investigation (CRS)</td>
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<td>Aug 25</td>
<td>Data collection techniques (CRS)</td>
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<td><strong>Adaptations</strong></td>
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<tr>
<td>Aug 30</td>
<td>Bioluminescence (JCD)</td>
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<td>Sept 1</td>
<td>Physiological adaptations (JCD)</td>
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<td>Sept 6</td>
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<td>Sept 8</td>
<td>Energetics (JCD)</td>
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<td>Sept 13</td>
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<td>Sept 15</td>
<td>Pelagic-benthic coupling – Food supply (JCD and CRS)</td>
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<td><strong>Community Composition and Dynamics</strong></td>
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<tr>
<td>Sept 20</td>
<td>Instructors gone – no class</td>
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<td>Sept 22</td>
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<td>Sept 27</td>
<td>Instructors gone – no class</td>
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<td>Sept 29</td>
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<td>Oct 4</td>
<td>Depth zonation, trends in body size and the source-sink hypothesis (CRS)</td>
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<td>Oct 6</td>
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<td>Oct 11</td>
<td>Diversity and evolution – local and regional patterns (CRS)</td>
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<td>Oct 13</td>
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<td><strong>Habitats</strong></td>
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<td>Oct 18</td>
<td>Seamounts (Les Watling)</td>
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<td>Oct 20</td>
<td>Canyons and Trenches (JCD)</td>
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<td>Oct 25</td>
<td><strong>Topics due</strong></td>
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<td>Oct 27</td>
<td>Hydrothermal vents (CRS)</td>
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<td><strong>Mid-Semester evaluation</strong></td>
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<td>Nov 1</td>
<td>Cold seeps and whale falls (CRS)</td>
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<td>Nov 8</td>
<td>Oxygen Minimum Zones – present and future (JCD)</td>
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<td>Nov 10</td>
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<td><strong>Anthropogenic effects</strong></td>
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<td>Nov 15</td>
<td>Fisheries (JCD)</td>
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<td>Nov 17</td>
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<tr>
<td>Nov 22</td>
<td>Mineral Exploitation (CRS)</td>
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Nov 29
Dec 1 Climate change (JCD and CRS)

Dec 6
Dec 8 Topic presentations

Dec 13 9:45-11:45 Topic presentations

**Graduate Grading Scheme**
- Paper discussions 50 points
- Topic presentations 50 points
- Total 100 points

**Paper discussions (sessions to be divided evenly amongst students)**
- Each student will be assigned 2-3 papers to lead a discussion section
- Provide an outline on powerpoint
  - Introduce the rational for study
  - Hypotheses or goals
  - Major findings
  - Conclusions
- Be prepared with one or two questions per paper to stimulate discussion
- You will receive an evaluation of your presentation by your instructors

Your course grade on this subject is also dependent upon your participation in discussions led by your colleagues

**Topic Presentations**
- Choose a topic relating to deep-sea biology and review it via a 15 minute presentation
- Introduce the topic, why you chose it, review the major results and conclusions
- Summarize by identifying where the gaps are and critiquing progress in the field
- 15 minutes + 5 minutes for questions
- Presentation (powerpoint file) with bibliography due at time of presentation
- Evaluation by your peers and instructor
- Topics due Oct 25th - email a paragraph describing it