FW 2003 Marine Biology: Overview of structure and expectations

Location: 495 Hodson Hall, St. Paul
Time: MWF 12:50-1:40, Spring semester.
Prerequisites: Biol1001 or Biol1009 or Biol2012, or Geol1006 or Instructor Consent

Instructor: Professor Peter W. Sorensen, 104 Hodson Hall, St. Paul. Soren003@umn.edu; 612-224-4997, Office Hours: 3:30-4:30, Mondays or By Appointment.

TA: This class has a part time TA, Jake Osborne (132 Hodson Hall), who will give a few lectures, lead discussion groups, and is available for one-on-one meetings every Friday at 2PM upon request. If you have questions, please contact him directly (osbo0156@umn.edu).

Description and course goals: Oceans comprise nearly three-quarters of the planet’s surface, contain the majority of its organisms, and are key to our survival, but they are also poorly understood. This course seeks to instill a basic understanding of, and interest in, the major themes of life in the oceans including the nature of the aquatic life, the diversity and ecology of oceanic ecosystems, and the effects of human civilization on these systems. Selected key advances in the study of marine fishes, marine mammals, pollution and other topics of special interest to basic biology, conservation and society will be addressed. Successful students will be able to accomplish the following tasks at the conclusion of this class:

- Ask insightful questions about marine biology
- Know how to find answers to their questions
- Describe major groups of marine organisms, their biology, and ecological function
- Describe the importance of the sea to the evolution and sustenance of life on our planet
- Be good global citizens

Work habits required to meet these goals:

- Attend class and take careful, thoughtful notes, review these notes after class and before exams asking yourself what the key points are and why.
- Read chapters and readings at least twice, asking yourself what the key points are
- Pay careful attention to videos, take notes and ask yourself what are the important, scientific take home messages.
- Attend all discussion sessions (stay involved).
- Review notes posted on WebVista and ask questions in class.
- Read outside of class.
- Participate: think and ask questions about why things are the way they are!
- When in doubt ask the instructor and/or TA. Get involved!

Text: Our text is Marine Biology, 8ed. by Castro and Huber. The last few editions of this book differ little and all will suffice if you can find a used copy. To do well in this class you will need to read and understand this book. Excellent support information has been provided by the text: http://highered.mcgraw-hill.com/sites/0073524166/information_center_view0/. Be aware that the instructor does not think highly of the example quizzes and does not use them.
Readings: A number of Scientific American readings have been assigned. These readings are available on-line and you will be graded on your understanding of them in class discussion sessions (see below).

Videos: Videos will be shown in class to illustrate and explain ecological relationships. Most are from the series Blue Planet. You will be graded on your understanding of these videos as you are able to demonstrate via short documentaries that you hand in afterwards. You may miss one of these assignments without penalty.

Class Discussions: Approximately once every other week 15 minutes of class will be devoted to a class discussion on either a video or an assigned reading. You are expected to attend these discussions and hand in a sheet reporting on that material and your impressions of it at the end of these discussions. This material is graded and you will be penalized if it is handed in late.

Class Paper: A 4-5 page paper is required by April 26. You are strongly encouraged to submit ideas for this topic to the instructors by March 22 and will be given helpful feedback. Drafts of papers are due in class April 5 for class review. Drafts will be reviewed informally by instructors until April 15. Specific requirements for this paper are found on the “Papers for FW2003” sheet.

Optional Field Lab: An optional HANDS-ON 2-credit field course (CFANS 3500) is planned for August 14-24 which will introduce students to topical marine habitats and research concepts at the Bimini Biological Field Station, the Bahamas. Applications are due February 15. Preference will be given to students who take FW2003. Cost will be approximately $2600. Additional details are available on request and are on the class website (see below).

Web Support: Most materials related to class (PowerPoint presentations, syllabi, quiz reviews, class notes, etc.) will be available on the class WebVista site: ‘FW 2003 - Section 001 - Spr 2010’. Powerpoint presentations will generally be placed on line before class to help you take notes. However, please note that as a result this means that they will NOT precisely mirror class presentations. Thus, it is important to come to class! Important topics will be noted on the Powerpoint slides with asterisks. Abbreviated study notes/questions, along with references for optional outside readings, will also usually be posted online. THIS MATERIAL IS INTENDED TO HELP YOU UNDERSTAND READINGS AND CLASS LECTURES BUT NOT TO REPLACE THEM.

Grading
Grades will be based on a quiz, a midterm, a short paper, class participation, and a final exam:

Exams: The quiz and exams will explicitly cover material covered in class and/or in the readings/videos up to the time of the previous exam. Material covered before the previous exam may be addressed if it is relevant to more recent material. Exams will emphasize material covered in class but may draw upon material in the text that was not explicitly reviewed in-class if lecture time was short. Materials found in the videos may be found on the exams. Exams will consist of multiple choice and short answer responses. The quiz is intended to introduce you to the instructor’s expectations. Improvement in performance will be rewarded with extra credit.

Class Participation
Grades will be largely based on your involvement in class discussions of class videos and
assigned readings (20%). This will require you to hand in a short written summary on a form downloaded from WebVista. These summaries must be handed in the day of the discussion or the next class. NO EXCEPTIONS. There will be 12 discussions and you may miss one each half-semester without penalty. Your 10 best discussion scores will be used to determine your final grade. Each of these sessions will be worth 2% of your grade (2 points). Cogent, clearly and articulated written comments on the scientific and societal significance of the material evaluated will be rewarded up to 1.5 points. If you can identify a clear question about the topic reviewed you will earn another 0.5 point. Up to a point will be deducted if the forms are not legible (typing is encouraged).

Paper
The paper will require topic selection and original library research and critical synthesis. Quality of writing will be evaluated. Details are found on the “Papers for FW2003” sheet

Grading will be as follows:
10% Quiz
25% Mid-Term exam
20% Paper
25% Final Exam*
20% Class Participation**
100%

* Extra credit of up to 2% for students who demonstrate improvement in the final exam
** Largely based on discussion sheets but extra credit of up to 3% for students who ask questions in class and during discussions

Attendance Policy:
Attendance is required. Makeup exams will only be allowed if a student is sick or has a family emergency, and the student provides written documentation from a doctor (see: http://www.policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html). If a student knows they must miss a quiz or exam because of an unavoidable conflict (University activity, medical treatment, etc), the student must inform the instructor by email at least 2 weeks in advance in writing and be willing to take the exam early. A missed exam without approval or medical excuse is a failure.

Grades will be awarded as follows:
Marine biology covers a huge amount of complex material and this is a challenging course. Generally, grades are scaled at the end of the semester so that the top achievers have the equivalent of an A+. All students who are deemed to have mastered the material will get at least a C.

A—achievement that is truly outstanding relative to the level necessary to meet course requirements. Approximately 10% of the students in the class can expect an A.
B—achievement that is significantly above the level necessary to meet course requirements.
C—achievement that meets the course requirements in every respect. Perhaps a third of the class will get a C.
D—achievement that is worthy of credit even though it fails to meet fully the course requirements.
F (or N)—Represents failure (no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I (see also I).
S—achievement that is satisfactory, which is equivalent to a C- or better (achievement required for an S is at the discretion of the instructor but may be no lower than a C-).
I—(Incomplete) Assigned at the discretion of the instructor when, due to extraordinary circumstances, e.g., hospitalization, a student is prevented from completing the work of the course on time. This requires a written agreement between instructor and student. Incomplete coursework is a major inconvenience for students and instructors.

Grade Disputes: If a student wishes to dispute the grade assigned, they must do so in writing 24 hours after the exam has been returned. They should include a specific rationale for why their answer is correct, or why the paper deserves a higher grade. The instructor reserves the right to re-grade the entire exam if an exam grade is disputed.

Academic Integrity:
Scholastic misconduct is broadly defined as "any act that violates the rights of another student in academic work or that involves misrepresentation of your own work." Scholastic dishonesty includes, but is not necessarily limited to: cheating on assignments or examinations; plagiarizing, which means misrepresenting as your own work any part of work done by another; submitting the same paper, or substantially similar papers, to meet the requirements of more than one course without the approval and consent of all instructors concerned; depriving another student of necessary course materials; or interfering with another student's work. Academic dishonesty in any portion of the academic work for a course shall be grounds for awarding a grade of F or N for the entire course.

Disabilities Statement:
It is university policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact university advising centers and the instructor to discuss their individual needs for accommodations.
FW 2003 Marine Biology

Syllabus

PART I. PRINCIPALS OF MARINE BIOLOGY

Introduction to the Discipline of Marine Biology  Chapter 1
1  Jan 20 (Wed)  Introduction to the Course, History of the discipline

2  Jan 22  BBC Planet Earth video: ‘Ocean World’

Introduction to the Oceans – the Sea Floor  Chapter 2
3  Jan 25 (Mon)  Class Discussion #1 - video,
                    Introduction to the oceans

4  Jan 27  Introduction to the oceans, continued

Chemistry and Physics of Sea Water -I  Chapter 3
5  Jan 29  The physics of water, current systems, and tides

Fundamentals of Biology  Chapter 4
6  Feb 1 (Mon)  Class Discussion #2 – reading (Life in the Ocean)
                    The challenges of living in the Sea

  *The last day to drop course without receiving a ‘W’*

Chemistry and Physics of Sea Water –II  Chapter 3 (cont)
7  Feb 3  What a marine biologist should know about the chemistry of sea water
                    Guest lecturer: Dr. Katsumi Matsumoto

PART II. MARINE LIFE

The Microbial World  Chapter 5
8  Feb 5  Class discussion #3 - reading (‘The Ocean’s Invisible Forest’)
                    Prokaryotes, protozoans, fungi

Chemistry and Physics of Sea Water –II  Chapter 3 (cont)
9  Feb 8 (Mon)  What a marine biologist should know about plate tectonics
                    Guest lecturer: Dr. William Seyfried

10  Feb 10  Unicellular Algae, continued
Seaweeds and Plants

Chapter 6

11 Feb 12  Seaweeds

12 Feb 15 (Mon)  Higher Plants

DEADLINE FOR FIELD COURSE APPLICATIONS*

QUIZ

13 Feb 17  Quiz review, BBC Blue Planet video: ‘Seasonal Seas’

14 Feb 19  QUIZ  (Peter away, Jake in charge)

Class discussion #4 - Video

Marine Invertebrates

Chapter 7

15 Feb 22 (Mon)  Sponges and worms

16 Feb 24  Arthropods and Echinoderms

Vertebrates; Marine Fishes

Chapter 8

17 Feb 26  Introduction to vertebrates, primitive vertebrates

Discussion #5 – reading (‘Secrets of the slime hag’)

18 March 1 (Mon)  What’s important and interesting about marine mollusks?

Guest lecture: Dr. Karen Mesce

19 March 3  Fishes-I: Sharks (Peter away?)

20 March 5  Fishes-II: Teleosts

21 March 8 (Mon)  Discussion #6 – reading (‘Why are reef fish so colorful?’)

Fishes-III: Teleosts2, Mid-Term Exam review,

22 March 10  MID-TERM EXAM

Marine Reptiles, Birds and Mammals

Chapter 9

23 March 12  Marine reptiles, Marine mammals-I

March 16-21  SPRING BREAK!

* March 15 last day to drop course without special approval from University*

24 March 22 (Mon)  Marine Birds (Erin Roche, Guest lecturer)

*Paper proposal ideas due (optional)*

25 March 24  BBC Blue Planet video: ‘Tidal Seas’ (Peter away)
26 March 26  Discussion, Exam review, Marine Mammals-II
27 March 29 (Mon)  Marine Mammals-III

**PART III.  MARINE ECOSYSTEMS**

- Please read chapter 10 (a review on marine ecology) on your own-

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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>28 March 31</td>
<td>Rocky Shores, Soft bottoms, Inter-tidal Communities</td>
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**PART III. MARINE ECOSYSTEMS**

- Please read chapter 10 (a review on marine ecology) on your own-

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<th>Date</th>
<th>Topic</th>
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<tr>
<td>29 April 2</td>
<td>Estuaries</td>
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<td>Guest lecturer: Dr. Uli Munderloh</td>
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<th>Date</th>
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<tr>
<td>30 April 5</td>
<td>Flex, Discussion of writing Peer review of draft papers in class (bring in your paper)</td>
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<th>Date</th>
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<tr>
<td>31 April 7</td>
<td>Life on/above the Shelf</td>
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<tr>
<td>32 April 9</td>
<td>Reefs</td>
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<th>Date</th>
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<tr>
<td>33 April 12</td>
<td>BBC Blue Planet video: ‘Coral Seas’ and Discussion</td>
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<td>OPTIONAL EARLY DUE DATE FOR PAPERS (hand in now for 10% bonus on paper grade)</td>
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<td>34 April 14</td>
<td>Epipelagic food webs</td>
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<td>35 April 16</td>
<td>BBC Blue Planet video: ‘Open Ocean’</td>
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<td>36 April 19</td>
<td>The Twilight world</td>
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<td>37 April 21</td>
<td>BBC Blue Planet video: ‘The Deep’</td>
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<th>Date</th>
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<tr>
<td>38 April 23</td>
<td>Polar marine biology Guest lecturer: Dr. Scott O’Grady</td>
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**PART IV. HUMANS AND THE SEA**
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<th>Date</th>
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<tr>
<td>April 26 (Mon)</td>
<td>Introduction to Fisheries (I- definitions and terms)</td>
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<td>April 28</td>
<td>Video: ‘Empty Oceans, Empty nets’ (Peter away)</td>
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<td>April 30</td>
<td><strong>Class Discussion #11 – Video</strong></td>
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<td>Fisheries (II): Case examples of wild fisheries and extended discussion</td>
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<td>Class evaluation?</td>
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<td>May 3 (Mon)</td>
<td>Fisheries (III; Mariculture), Jake</td>
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<td>May 5</td>
<td><strong>Class Discussion #12 - reading (‘Enriching the ocean to death’),</strong></td>
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<td>Marine Conservation and marine protected areas</td>
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<td>Guest lecturer: Karen Oberhauser</td>
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<td>May 7</td>
<td>The Oceans and human affairs</td>
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<td>Wrap up and review</td>
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**FINAL EXAM:**
May 11 (Tuesday) 1:30-3:30 495 Hodson Hal