

Course Outline
Fall 2009 Semester

COURSE NAME: Introduction to Marine Biology
COURSE NUMBER: BIOL 141-01
INSTRUCTOR: Mr. Marc Simmons
OFFICE: S114
OFFICE HOURS: Monday, Wednesday, Friday 10:00-10:50; Tuesday, Thursday 10:30-11:50; and by appointment
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COURSE DESCRIPTION: This course is an introduction to biological aspects of major marine environments. Local habitats are used as examples for a survey of common marine organisms and to study interactions between organisms and their surroundings. Emphasis is placed on human relationships to the ocean environment. Communities to be investigated are primarily rocky coast, marsh-estuary, and sandy beach. The course also includes a discussion of marine mammals.
Lecture: 3 hours Laboratory: 2 hours

PREREQUISITE: Preparing for College Reading II (ENGL092), Introductory Writing (ENGL099), and Fundamentals of Mathematics (MATH010), or waiver by placement testing results, or Departmental Approval.

REQUIRED TEXTS:
Text: Karleskint, G., Turner, R., and Small, J.W. 2010. Introduction to Marine Biology. 3rd edition. Belmont, CA: Brooks/Cole/ Cengage Learning.)

COURSE OBJECTIVES: At the successful completion of this course each student will have an understanding of the recurring biological and physical principles and relationships as they relate to marine biology. By the end of the course, students should be able to:

- Explain how the physical properties of the ocean impact marine life. This includes describing the properties of seawater and principles of currents and tides;
- Describe the autotrophic and heterotrophic components of the marine environment. This includes placing bacteria, phytoplankton, seaweeds, invertebrates, and vertebrates into the broader context of diversity of life and explaining how these organisms are classified within the taxonomic system used by biologists;
- Describe the biological and physical parameters of major marine and estuarine habitats, including a rocky shore, sandy beach, salt marsh, coral reef, and open ocean; and
- Demonstrate informed judgments about the effects of human activities on the marine environment.

Specific departmental course outcomes are listed at the end of the syllabus. Specific reading and lab objectives will be handed out with each unit.

CLASS FORMAT: We will use a lecture/demonstration/discussion approach. Laboratory will usually be integrated into the lecture so be prepared for lecture and lab each day. You are encouraged to contribute relevant information whenever appropriate and upon recognition by the instructor. However, private comments and conversations are not allowed. To succeed in this class, you should attend each lecture. Tape recording is permitted and encouraged. Good note taking is very important. Questions about the material are encouraged at any time during or after class.

How to Prepare for Lecture and Laboratory

The student should spend a minimum of two hours preparing for each class by pre-reading the assigned pages from the text or laboratory exercises. Reading assignments on the syllabus are general and refer to the chapter(s) in the text that related to the material covered in lecture. Use the guide given to you in class to direct your reading in the text. It is helpful to look over the material related to the topic before coming to class as this preparation will allow you to become a more active participant in the learning process. Class discussion will be augmented by use of handouts, PowerPoint, DVDs, and live or preserved organisms. I will be using a tablet PC and all board notes will be uploaded to the course site on CE6 (WebCT). You can then use the text to enhance the explanation of the material covered in class. Quiz and test questions will come from material covered in lecture and lab.

During laboratory sessions students will work individually or in small groups to complete the assigned tasks. Procedures are outlined in the laboratory exercises. The student should carefully read over each procedure before coming to lab. The instructor will demonstrate any specific procedures.

Students are encouraged to meet frequently with the instructor for additional help with the course material, study skills, test taking skills, and writing skills. Office hours are posted outside my office door, on my CE6 site and on this syllabus. If these hours are not convenient, please see me about scheduling an appointment. Students are also strongly encouraged to use the ARC for individual and small group tutoring. The ARC also has a wide variety of review materials that many students have found very useful. Students are also encouraged to use the interactive study guide that is packaged with your text.

ATTENDANCE POLICY:

You are expected to attend all meetings of the course each week. An outgoing spirit of active participation is your best assurance of success. If extenuating circumstances force you to miss a class, please inform me in advance (if possible) or upon your return to class. You are responsible for making up any material missed.

You are expected to be present in the classroom at the **BEGINNING** of the class period. **LATE ARRIVALS** disturb the class and will **NOT** be tolerated.

GRADING:

Your final grade will be determined by a series of announced quizzes, one-hour lecture exams, final exam, laboratory exams, laboratory reports, and writing assignments according to the following point system:

| | | |
|------------------------------|---------------|-------------------|
| Weekly Quizzes/Activities = | 20 % = | 100 points |
| Marine Mammal Project = | 5 % = | 50 points |
| 3 Lecture Exams = | 30 % = | 300 points |
| 1 Comprehensive Final Exam = | 20 % = | 200 points |
| Laboratory Notebook = | 10 % = | 100 points |
| Dissection = | 5 % = | 50 points |
| Group Research Project = | 10 % = | 100 points |
| <u>Final Lab Practical =</u> | <u>30 % =</u> | <u>100 points</u> |
| Total = | | 1000 points |

Final grades will be determined as follows:

| | | | | |
|----|---|-----------------|---|-----------------------|
| A | = | 92.5% or higher | = | 925 points or greater |
| A- | = | 90.0% - 92.4% | = | 900-924 points |
| B+ | = | 87.5% - 89.9% | = | 875-899 points |
| B | = | 82.5% - 87.4% | = | 825-874 points |
| B- | = | 80.0% - 82.4% | = | 800-824 points |
| C+ | = | 77.5% - 79.9% | = | 775-799 points |
| C | = | 72.5% - 77.4% | = | 725-774 points |
| C- | = | 70.0% - 72.4% | = | 700-724 points |
| D+ | = | 67.5% - 69.9% | = | 675-699 points |
| D | = | 62.5% - 67.4% | = | 625-674 points |
| D- | = | 60.0% - 62.4% | = | 600-624 points |
| F | = | 0.0% - 59.9% | = | 0-599 points |

Weekly quizzes will consist of a short series of questions and will be given the first ten minutes of class. **DO NOT ARRIVE LATE** or you may find that you have inadequate time to take the quiz. Normally a missed quiz will be assigned a zero grade. However, exceptions may be made for extenuating circumstances with the proper documentation, as decided by the instructor on a case-by-case basis. The lowest lecture quiz grade **or** a zero-grade for a missed quiz will be dropped.

For each Chapter, a reading guide and set of objectives will be handed out. Exams are based on the reading objectives, so these should be used as study guides. Note that while these reading guides will not be collected, they are intended as study guides and you are responsible for understanding the information they contain.

There will be a total of three lecture exams throughout the semester. Exams may consist of a mixture of multiple choice, true/false, figures, fill-in-the-blank, matching, short answer, and essay questions. You will not be allowed to make up an exam during the semester, so a missed exam will be assigned a zero grade. Exceptions will be made only under extraordinary circumstances **and** when the proper documentation is provided.

The final exam will have the same format as a lecture exam. It will be a comprehensive exam on the major concepts discussed throughout the semester. A missed final exam will not be made up or an Incomplete grade given except under extraordinary circumstances and by prior arrangement, when the proper documentation is provided. The final exam date and time will be arranged by the Registrar.

Although marine mammals contribute to a very small percentage of the diversity of marine animals, in the past students have expressed great interest in learning more about them. This project is designed to allow students to explore the characteristics of marine mammals in greater detail. Students will create and present posters to the class describing the characteristics and ecological role of particular species of marine mammals. Details will be explained in a separate handout.

Throughout the semester, students will be making observations about various organisms and about specific ecosystems. Any observations made during lab or during fieldwork should be placed into a laboratory notebook or “journal”. It will be appropriate to make drawings of some of the organisms or structures observed, labeling the appropriate details and noting any behaviors or activities. This is an especially useful method for documenting microscopic organisms and structures. For macroscopic organisms or structures, students may want to include images of the organisms observed along with their descriptions. In addition to illustrations, images from the internet can be downloaded and annotated; remember to include the specific url for the image in order to provide the appropriate documentation of any resources used. Periodically, I will review the lab notebooks and make comments. Students can respond to the comments by, when possible, reviewing the materials they had observed and adding notations to their notebooks; all original notations should remain in the notebook. As a general rule, laboratory and field observations are never altered after the observations are completed. On the day of the final, a grade will be assigned to the lab notebook.

As we study fish, we will be learning about their structure and function. Students will be dissecting a shark and identifying the anatomical structures of specific organ systems. Students will be examined on their knowledge of shark anatomy as representative of fish anatomy both on the Unit 2 Exam and on the Final Lab Practical. Students will receive grades both for the quality of their dissections and for their performance on the exams.

Once we have completed our study of the diversity of marine organisms, students will design an experiment using one of the organisms studied as a model organism for exploring a particular problem in greater detail. Students will form groups of three to four individuals and be randomly assigned a question by the instructor. Following the steps of the scientific method, the group will use that question to form a hypothesis, design and conduct an experiment to test that hypothesis, and present their results to the class. Questions will be assigned and restrictions will be placed on the types of experiments that can be done, due to constraints regarding available resources. Humane treatment of the live

organisms used is also of utmost concern. Specific guidelines will be provided in a separate handout.

Finally, at the very end of the semester, students will be assessed as to their ability to identify the taxonomic groupings of the organisms they observed in lab through the process of a Final Lab Exam. Representatives from each taxonomic group studied will be presented at various stations around the room. Students will be asked to identify all of the organisms and the type of ecosystem of which they are most commonly a part. This is where a good laboratory notebook (or a photographic memory) is very helpful.

Note: While Extra Credit has its places, it has been overused and distorted. There are no extra credit opportunities in this course. Much extra credit is done at the expense of other work. If you wish to improve your grade, read, study, attend class, study harder. And *smarter*.

HELPFUL HINTS: When having difficulties, seek help from the instructor at the first indication of a problem. Set up study groups with other students in lecture and laboratory. Prepare for each class by completing objectives and reading guides. There are several resources available if extra help is needed.

DISABILITY: SERVICES The Biology department embraces the position of the disability service providers at the college. “Students with disabilities who believe that they may need accommodations in the classroom are encouraged to contact a disability counselor as soon as possible. Students at the Brockton Campus with learning disabilities should contact Andrea Henry, at extension 1805. Students with physical disabilities at the Brockton Campus should contact Mary Berg, at extension 1425. All students at the Canton Campus should contact Mary Berg at extension 2132.”

STUDENT RESPONSIBILITIES: Freedom to teach and freedom to learn are inseparable facets of academic freedom. The freedom to learn depends upon appropriate opportunities and conditions in the classroom, on the campus, and in the larger community. The responsibility to secure and respect general conditions conducive to the freedom to learn is shared by all members of the academic community - students, faculty, and staff members.

The orderly operation of the college or classroom would suggest that students:

- Be prepared academically for each class.
- Attend class regularly.
- Turn off all cell phones, PDA's and iPods before coming to class. During an exam or quiz, if a device in your possession makes any type of audible noise you will earn a zero.
- Arrive at class on time and remain until the end of the class.
- Consult with their instructor prior to class if it is necessary to leave class early.
- Adhere to the college policy prohibiting food, drink, smoking, and the use of tobacco in the classroom.

- Treat all college property with respect.
- Leave the classrooms and laboratories neat and tidy.
- Respect the rights of others to an education and not disturb the learning process in any way.
- Obtain a copy of the student handbook and become familiar with college policies and procedures.

ACADEMIC INTEGRITY: Students are responsible for maintaining the highest standards of academic honesty and integrity in this course. Violations of academic honesty will usually fall in one of two categories: cheating or plagiarism. Cheating includes, for example, copying or buying the work of others; hiring or persuading others to do work under a false name; concealing notes or other helpful materials during an exam; communicating with your classmates during an exam. Plagiarism is the use of another person's work or ideas as one's own without giving appropriate credit. In short, plagiarism is intellectual theft and is, therefore, taken seriously; consequently, using the ideas or language of others in an oral, written, technical, or artistic work must be properly acknowledged and documented. Students are responsible for understanding what constitutes plagiarism in their classes and should note that these offenses are often very easy for the instructor to catch. In this class, the penalty for cheating and plagiarism will be a grade of zero for the work in question and possibly a failing grade for the course.

| DATE | TOPICS | ASSIGNMENT |
|-------------------------|---|--|
| SEPT. 8, 10 | <i>Introduction to the Science of Marine Biology Lab Safety</i> | Chapter 1: pp1-13 |
| SEPT. 15, 17 | <i>Geology of the Oceans The Properties of Water Motion in the Ocean</i> | Chapter 3: pp44-67 Chapter 4: pp69-97 |
| SEPT. 22, 24 | <i>Biological Principles and Classification Introduction to Microbes and Microscopy</i> | Chapter 5: pp99-123 Chapter 6: pp125-138 |
| SEPT. 29, OCT. 1 | <i>Photosynthesis and Primary Producers</i> | Chapter 7: pp159-189 |
| OCT. 6 | EXAM 1 | Chapters 1, 3-7 |
| OCT. 8 | <i>Protozoans and Lower Invertebrates</i> | Chapter 6: pp138-153 Chapter 8: pp191-207 |
| OCT. 13, 15 | <i>Worms and Mollusks</i> | Chapter 8: pp207-217 Chapter 9: pp219-239 |
| OCT. 20, 22 | <i>Arthropods and Echinoderms</i> | Chapter 9: pp240-254 |
| OCT. 27, 29 | <i>Hemichordates, Urochordates, Cephalochordates, and the Fishes</i> | Chapter 9: pp254-261 Chapter 10: pp263-295 |
| NOV. 3, 5 | <i>Marine Reptiles and Birds Introduction to Marine Mammals</i> | Chapter 11: pp297-323 Chapter 12: pp325-355 |
| NOV. 10 | EXAM 2 & MAMMAL PROJECTS | Chapters 6, 8-12 |
| NOV. 12 | <i>Introduction to Ecology</i> | Chapter 2: pp15-43 |
| NOV. 17 | PRE-REGISTRATION DAY | NO DAY CLASSES |
| NOV. 19 | <i>Rocky Shores and Sandy Beaches</i> | Chapter 13: pp357-385 |
| NOV. 24 | <i>Salt Marshes and Other Estuaries</i> | Chapter 14: pp387-411 |
| NOV. 26 | THANKSGIVING BREAK | NO CLASSES |
| DEC. 1, 3 | <i>The Coral Reef The Open Sea and Life in the Depths</i> | Chapter 15: pp413-441 Chapter 16: pp443-461 Chapter 17: pp463-485 Chapter 18: pp487-505 |
| DEC. 8, 10 | <i>Marine Resources Human Impact on the Marine Environments</i> | Chapter 19: pp507-531 Chapter 20: pp533-555 |
| DEC. 15 | EXAM 3 AND LAB EXAM | Chapters 2, 13-20 |
| DEC. 17 | <i>Presentation of Research Projects</i> | |
| DEC 21-24 | FINAL EXAM – TIME TBA | |

Note: Schedule is subject to change. Pay attention in class for changes.

Learning Outcomes for Introduction to Marine biology

1. Marine Environment :

- a. To learn basic chemical and physical properties of ocean water in order to understand how abiotic factors affect marine organisms.

2. Classification:

- a. To survey major groups of marine organisms to understand the process of evolution and the unity and diversity of life.
- b. To learn the basic life histories of major groups of marine organisms so students can understand the processes of growth and reproduction and the importance of sexual reproduction to the evolution of the species.

3. Ecology:

- a. To learn basic ecological concepts such as energy flow and chemical cycling so that students can appreciate the interrelationships among organisms and their environments.
- b. To learn basic relationships between organisms and their environments and between organisms and other organisms so that students can appreciate their value in the ocean ecosystems.

4. Marine Mammals:

- a. To learn the major groups of marine mammals, their life history, ecology and conservation so that students can appreciate their value in the web of life.

5. Human Relationships with Marine Environment:

- a. To be able to describe the relationships of humans to the marine environment so that students can appreciate the value of the ocean and its resources.

6. Communities:

- a. To compare and contrast selected local ecosystems so that students can apply their knowledge of marine plants and animal life cycles to particular environments.

7. Laboratory Skills:

- a. To work safely in the laboratory and follow simple laboratory protocols in order to work cooperatively to complete laboratory exercises and conduct experiments.
- b. To be able to use dissecting and compound microscopes to observe cells and organisms in order to develop good techniques in preparation for more advanced courses.
- c. To learn basic lab skills such as use of basic labware, measuring, performing environmental parameter tests to develop good lab technique.
- d. To be able to use dichotomous keys to identify organisms; to compare and contrast physical features to sharpen student observation skills.

8. Study Skills:

- a. To apply a study skills method to learning biology in order to improve success in an academically rigorous course.