

## Introduction to Marine Science

**BIO K175 (TO1), Three sem. hrs. credits**

**CRN: 10218**

**Spring 2009**

**Web page: [http://www.trcc.commnet.edu/Prog\\_Study/Sciences/dopirak/index.htm](http://www.trcc.commnet.edu/Prog_Study/Sciences/dopirak/index.htm)**

**Three Rivers Community College**

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**Office Hours: T – 5:00-6:00pm; W - 4:00-5:00pm;**

**R: 2:00-3:00pm (Or by appointment)**

**(Or by appointment)**

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### **Required Text:**

Morrissey, J.F. and J.L. Sumich. 2009. *Introduction to the Biology of Marine Life; 9<sup>th</sup> edition*. Jones and Bartlett Publishing. 454p. ISBN: 978-0-7637-5369-6

### **Catalog Description:**

An introductory course in marine science. Topics to be explored include: general marine biology, intertidal ecology, plankton biology, marine communities, and the geomorphology of the New England coast. Some field work will be involved.

### **Primary Objectives:**

Students should expect to learn the fundamentals of marine biology and understand ecological principles that govern marine systems. Also, emphasis will be placed on various marine systems such as: energy transfer, organismal biology, organism adaptations to seawater, marine habitats, and oceanic circulation.

### **Attendance Policy:**

Students are expected to attend class regularly, as in accordance with TRCC attendance policy. If a class is missed due to circumstances beyond your control, **please**, be sure to notify your instructor and make the necessary arrangements for obtaining the lecture notes. **You will be responsible** for the material. If you **miss three** or more classes your **final grade** will be dropped by **half a letter grade**. A five point bonus will be implemented to your final grade if **100%** attendance is noted.

### **Grade Evaluation:**

Although the subject matter does tend to build on itself, there will be three non cumulative examinations. The third exam will be given during Final Exam week (**14 May 2009**). There will be twelve weekly quizzes. The lowest quiz grade will be dropped. Exam and quiz questions will consist of multiple choice, matching, and short answers. Some questions will come directly from the Review questions and Questions for Further Discussion section following every chapter.

### **Add/Drop Procedures:**

Please consult the TRCC catalog for this policy.

**Suggestions for the course:**

To gain a better understanding be sure to read the required reading sections **before** coming to class. Also, be prepared to participate in classroom discussions.

**Final Grade:**

100-98 = A	79-77 = C+
97-93 = A	76-73 = C
92-90 = A-	72-70 = C-
89-87 = B+	69-65 = D+
86-84 = B	64-60 = D
83-80 = B-	59-00 = F

A ten minute group oral presentation is expected. Selections for your presentation could be taken from a list of topics below, or from your own interests. More will be said pertaining to your presentations through the semester.

**Research Presentation Topics**

- 01) Hydrothermal vents
- 02) Estuarine circulation
- 03) Primary production in the sea
- 04) Marine mammology
- 05) Marine ornithology
- 06) Oceanic pollution
- 07) Biogeochemical cycling within the sea
- 08) Physical properties of seawater
- 09) Oceanic circulation
- 10) Marine organismal biology
- 11) El Nino effect
- 12) Sedimentation and sorting
- 13) Reproduction and larval ecology
- 14) Modes of reproduction
- 15) Organismal energy allocation
- 16) Thermal and osmoregulation of marine tetrapods
- 17) Estuarine productivity
- 18) Rocky intertidal zonation
- 19) Chromatic adaptation with respect to zonation of marine fauna
- 20) Hypoxia and 'Red Tides'

**Grading:**

Final grade will based on the following:

Examinations -----	70%
Quizzes -----	15%
Oral Presentation-----	05%
*Class Participation-----	10% +
-----	100%

\*Includes attendance and a voluntary research paper can be handed in for extra credit.

**Required Reading In Sumich;**

<b>Week</b>	<b>Topic</b>	<b>Chapters:</b>
1	Introduction. World's Oceans, Properties of seawater.	1
2	<b>Quiz 1:</b> Oceanic circulation, Basic biology	1+2
3	<b>Quiz 2:</b> Ecological concepts + energy flow in the sea	2
4	<b>Quiz 3:</b> Primary Productivity in the Sea	3+4
5	<b>Exam I</b> Organismal Biology of Marine Animals	5
6	<b>Quiz 4:</b> Organismal Biology of Marine Animals	6
7	<b>Quiz 5:</b> Estuarine + Benthic Systems	7
8	<b>Quiz 6:</b> Coastal systems	8
9	<b>Quiz 7:</b> Intertidal + Reef Systems	9
10	<b>Quiz 8:</b> Pelagic systems, <b>Review for Exam II</b>	10
11	<b>Exam II;</b> Benthic systems	11
12	<b>Quiz 9:</b> Polar systems	12
13	<b>Quiz 10:</b> Marine Fisheries	13
14	<b>Quiz 11:</b> Oceanic Pollution	13
15	<b>Quiz 12:</b> Oral presentations; <b>Review for Final Examination</b>	
12/13	<b>Final Examination</b>	

**Syllabus Revisions:**

This schedule may be subject to change as the instructor sees fit. Any changes will be announced by the instructor in advance.

**College Withdrawal Policy:**

A student who finds it necessary to discontinue a course once class has met must provide written notice to the registrar. Withdrawal forms are available at the Registrar's office on both campuses and the office at the Subase. Nonpunitive "W" grades are assigned to any withdrawal requested before the various unrestricted withdrawal deadlines, **See Registrar for dates.** After that period, a student wishing to withdraw must obtain written authorization of the instructor to receive a "W" grade on their academic record, non-punitive grade indicating termination of class participation. Students who do not withdraw, but stop attending **will receive** a grade of "F" for the final grade. Students are advised that withdrawal from 50% or more of their classes will result in being placed on **Progress Probation** for the following semester Eligibility for refund of tuition is based upon date of withdrawal when received by the Registrar. **Verbal withdrawals cannot be accepted.**

**Academic and Classroom Misconduct:**

The instructor has the primary responsibility for control over classroom behavior and maintenance of academic integrity, and can order the temporary removal or exclusion from the classroom, and/or laboratory, of any student engaged in conduct violative of the general rules and regulation of the institution. Extended or permanent exclusion from classroom, and/or laboratory, or further disciplinary action can be effected only through appropriate college procedure. Plagiarism, cheating, or any form of academic dishonesty is **prohibited**. Students guilty of academic dishonesty directly or indirectly will receive a **zero** for an exercise or exam and may receive an **F** for the course in addition to other possible disciplinary sanctions which maybe imposed through the regular institutional procedures. Any student that believes he or she has been erroneously accused may appeal the case through the appropriate institutional procedures if their grade was affected.

## **Detailed Course Outline**

- I** Introduction to the World's Oceans and Marine Science
  - A.** Disciplines within oceanography
    - 1) Biology and ecology
    - 2) Physical oceanography
    - 3) Chemical oceanography
    - 4) Geological oceanography
    - 5) Biological oceanography
  - B.** Historical timeline of marine science milestones
  - C.** Distribution of the World's Oceans
  - D.** Physical and chemical properties of seawater
  - E.** The ocean in motion
    - 1) Tides
    - 2) Currents
    - 3) Circulation
  
- II** Ecological and Biological concepts
  - A.** General nature of marine life
  - B.** Adaptations of marine life
  - C.** Basis ecological concepts
    - 1) Laws of thermodynamics and energy laws
    - 2) Food Webs
    - 3) Energy transfer
  
- III** Overview of Marine Organisms
  - A.** Systematic and taxonomic classification
  - B.** Plants: Primary Producers
    - 1) Phytoplankton
    - 2) Macroalgae
    - 3) Vascular plants
  - C.** Animals: Secondary producers + primary consumers
    - 1) Protozoans
    - 2) Porifera
    - 3) Cnidaria and Ctenophores
    - 4) Annelids and other wormlike phyla
    - 5) Mollusks
    - 6) Arthropods
    - 7) Echinoderms
    - 8) Chordates
  
- IV** Oceanic Habitats
  - A.** Benthic Communities
    - 1) Seafloor characteristics
    - 2) Deep-sea vents
  - B.** Coral Reefs
  - C.** Pelagic Communities
  - D.** Estuaries
  
- V** Coastal Habitats
  - A.** Salt Marshes
  - B.** Mangroves

- C. The intertidal Zone
  - 1) Sandy shores
  - 2) Rocky shores
  - 3) Mudflats
- VI Humans and the sea
  - A. Oceanic Resources
    - 1) Food from the sea: fisheries + fish farming
    - 2) Mining from the sea
  - B. Coastal Management
  - C. Oceanic Pollution
    - 1) Sewage
    - 2) Toxins
    - 3) Oil spills
    - 4) Floatables
- VII Special topics TBA

### **Detailed Course Objectives:**

After completing this course, the student will be able to:

- 01) Understand the scientific method and be able to formulate and test a hypothesis.
- 02) Know the subdisciplines of marine science (physical, biological, chemical, geological).
- 03) Understand distribution of the World's Oceans, movements of large water masses, and estuarine circulation.
- 04) Identify the properties of water and components of seawater.
- 05) Understand pH and key chemical reactions in the ocean.
- 06) Discuss the various biogeochemical cycles within the ocean.
- 07) Classify living organisms of major phyla.
- 08) Be able to use a taxonomic key to identify species.
- 09) Be able to identify common organisms of Long Island Sound and the New England coast.
- 10) Discuss adaptations and strategies of marine organisms for survival, reproduction, growth, mobility, defense, and competition.
- 11) Identify and characterize pelagic, coastal, benthic, estuarine, and intertidal habitats.
- 12) Understand ongoing ecological processes associated with oceanic habitats.
- 13) Have a broad understanding of the relationship of the World's Oceans to the global ecosphere.
- 14) Know the geological origins and present morphology of Long Island Sound.
- 15) Explain the economic and ecological importance of algae in aquatic environments.
- 16) Be aware of environmental threats to oceans, Long Island Sound, and coastal wetlands.
- 17) Be aware of negative impacts on coastal and marine systems (i.e. pollution, overfishing, overpopulation, wetland destruction).
- 18) Be aware of how choice lifestyle can minimize marine systems degradation.
- 19) Discuss possible solutions for currently arising problems within marine systems.
- 20) Gain a deep seeded respect and admiration for marine systems.