BIOLOGY OF MARINE ORGANISMS
BIOLOGY F3280
33191-F01-S2007

INSTRUCTOR: Gary A. Laursen, Ph.D.  
E-mail: ffgal@uaf.edu
Office: 305A Bunn.
Lab: 316 Bunn.
Office: 474-6295
474-5393


See other books and videos in Bunn. Rm. 316!

HANDOUTS (HO): Free

LECTURE: 10:30 a.m. to 12:00 p.m. M & W, 409 Bunnell (w/ Distributed Note sets)
Meets ORAL INTENSIVE communication requirement for Grad.

PREREQUISITES: Upper division standing and Comm. 131/141 or an equivalent. Biol. 105/106 knowledge level is assumed or OK if being taken concurrently!

COURSE DESCRIPTION:

Marine Biology, a 3-cr. “O” course, is designed to provide an in-depth introduction to the field of marine science, in a broad sense, for the mid-level undergraduate student with marine biological and oceanographic interests. Assumed is a minimum background in basic chemical, physical, and biological sciences, but certainly no more than would be obtained from introductory ‘100/200’ level courses. Familiarity with the major invertebrate phyla will indeed be helpful. Some acquaintance with basic ecological concepts is also helpful. If lacking, ecological concepts may be obtained from primary and supplemental readings in ecology.

Our focus will place emphasis on Ecological Processes and Adaptations that act to structure marine associations, ocean habitats, organismal distribution, classification, and functional morphology that permits their persistence through time.

Our course will not become a guided tour down the garden path toward knowing our Alaskan flora and fauna, necessarily. Where appropriate, information and data pertinent to Alaska will be provided. Unfortunately, the construct of our course, its relative proximity to marine systems, and the time of year, simply do not lend themselves to field or living-laboratory orientation. The 90-min. class meetings will allow for the use of traditional lectures supplemented with audiovisuals such as 35 mm color slides, VHS videos and Video-discs, occasional films, abundant overhead projections, preserved specimens, select “thematic” (e.g., larvae, animal phyla, marine algae) "laboratories".
It is my intent to duplicate formal NOTE sets for distribution and use during class discussions. Therefore, a 3-ringed notebook will be needed to contain myriad handouts in an organized manner. You will be given opportunities to:

1) “search the literature” for supplemental READING;
2) make five 3-min. scientific CRITIQUES on marine subjects of interest to you and hopefully to your classmates (see the critique subjects listing);
3) write an EXTENDED ABSTRACT on a literature research project of interest; and
4) prepare information for presentation to the class in a 15-min. oral presentation made during our 15th MARINE BIOLOGY COLLOQUIUM to be conducted, critiqued, evaluated by you and graded. (See Lect. Sched. for dates)

LEARNING OBJECTIVES:

It is the intent of your instructor to introduce and have you develop a working knowledge of the following biological paradigms, dogma, principles and/or concepts set in Marine Biological settings: water properties, oceanography, ecology of marine ecosystems (high [rocky], medium [sandy], low [muddy] energy beaches), lagoons, estuaries and salt marshes, benthos [kelp forests, seagrasses, mangroves, coral reefs], organismal communities [larvae, benthic, deep sea, phyto- & zooplankton, nekton, and meiofauna], primary production, marine symbioses, and human impacts.

GRADING:

Grades will be based on a total point accumulation (ca. 575) received from three lecture exams, Five Scientific Paper Critiques, the Abstract and Presentation at our Fifteenth Marine Biology Colloquium. Circa 35% of your grade will be “orally-based”.

This instructor also reserves the right to include other subjective “human element” considerations in determining final course grades; i.e., class attendance, improvement(s), extenuating and/or unforeseen circumstances, illness, motivation, effort, participation, and the general level of enthusiasm, to which points will not nor can they be assigned, but can indirectly affect point accumulation and the outcome of semester grades very dramatically. Platonic discourse and questioning strategies are used such that this class will become a discussion! Keep up with the readings and, whatever you do, don’t miss lectures!

I abhor cell phones especially those that go off in class!

Total points earned will conform to an Adjusted Point Total (APT = curved point total) that equals one half the difference between my Total Points Possible (TPP) and your highest Total Number of points earned in our course. The APT will then be set to the following % scale and superimposed such that:

A = 92 - 100 %
B = 82 - 91 %
C = 72 - 81 %
D = 65 - 71 %
F = 0 - 64 %
Point distributions will be made approximately as follows:

<table>
<thead>
<tr>
<th>POINTS</th>
<th>TASK</th>
<th>CHAPTERS</th>
<th>DATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>Sci. Paper Critique 1</td>
<td></td>
<td>Jan. 31 W Bunn. 409</td>
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<tr>
<td>25</td>
<td>Sci. Paper Critique 2</td>
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<td>Feb. 7 W Bunn. 409</td>
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<td>25</td>
<td>Sci. Paper Critique 3</td>
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<td>Feb. 21 W Bunn. 409</td>
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<td>25</td>
<td>Sci. Paper Critique 4</td>
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<td>Feb. 28 W Bunn. 409</td>
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<td>25</td>
<td>Sci. Paper Critique 5</td>
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<td>Mar. 7 W Bunn. 409</td>
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<tr>
<td>125</td>
<td>Lecture Exam 1</td>
<td>1, 2, P, D, Zooplankton</td>
<td>Feb. 14 W Bunn. 409</td>
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<tr>
<td>125</td>
<td>Lecture Exam 2</td>
<td>4, 3, 5, 7, Phytoplankton</td>
<td>Mar. 28 W Bunn. 409</td>
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<tr>
<td>125</td>
<td>Lecture Exam 3</td>
<td>9, 8, 10, 11</td>
<td>Apr. 23 M Bunn. 409</td>
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<tr>
<td>25</td>
<td>Colloquium Abstracts Due</td>
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<td>Apr. 16-EC, 18-Final</td>
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<tr>
<td>50</td>
<td>Colloquium Presentations</td>
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<td>Apr. 25, 30 &amp; May 7</td>
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<td>575</td>
<td><strong>TOTAL COURSE POINTS</strong></td>
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Biology of Marine Organisms Lecture & “Laboratory” Schedule

<table>
<thead>
<tr>
<th>DATES</th>
<th>TOPICS OF DISCUSSION</th>
<th>ASSIGNMENTS</th>
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<tbody>
<tr>
<td>JAN 15 M</td>
<td><em>Alaska Civil Rights Day</em></td>
<td>Closed Campus</td>
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<tr>
<td>JAN 16 T</td>
<td><em>FIRST DAY OF INSTRUCTION: Late registration &amp; financial aid begin</em></td>
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<td>JAN 17 W</td>
<td><strong>LECTURE:</strong></td>
<td>Read Ch. 1</td>
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<td><em>Introduction to the Course</em></td>
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<td>Syllabus</td>
<td>(HO)</td>
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<td></td>
<td>Marine Biology Colloquium</td>
<td>(HO)</td>
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<td></td>
<td>The Scientific Paper Critique &amp; Topics</td>
<td>(HO)</td>
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<td>Personal Data Card</td>
<td>(HO)</td>
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<td></td>
<td><strong>The Marine Environment</strong></td>
<td>Read Ch. 1</td>
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<td>Divisions of the Marine Environment</td>
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<td>Properties of Water</td>
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<td>Basic Oceanography</td>
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<td></td>
<td><strong>VIEW VIDEO #1:</strong> Miracle Planet (Check out for Home viewing)**</td>
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<td>JAN 22 M</td>
<td><strong>LECTURE:</strong></td>
<td>Read Ch. 1</td>
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<td></td>
<td><em>The Marine Environment Cont.</em></td>
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<tr>
<td></td>
<td>Ecological Principles</td>
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<td></td>
<td>Larvae and Larval Ecology</td>
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<tr>
<td></td>
<td>Comparisons of Terrestrial and Marine Ecosystems</td>
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<td>JAN 24 W</td>
<td><strong>LECTURE/LABORATORY:</strong></td>
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<td><em>Marine Animal Phyla-</em> The “Colonial Protistans” * &amp; Protostomes</td>
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<td></td>
<td><strong>VIEW VIDEO #2:</strong> In Search of the Giant Squid (Home viewing)</td>
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</table>
JAN  26 F  Last day for late registration, fee payment and 100% tuition refunds

JAN  29 M  LECTURE/LABORATORY:
             Marine Animal Phyla-The “Colonial Protists” & Protostomes
             VIEW VIDEO #2: In Search of the Giant Squid (Check out for Home viewing)

JAN  31 W  LECTURE/LABORATORY:
             Marine Animal Phyla-The Deuterostomes
             SCIENTIFIC PAPER CRITIQUE 1 w/ 3min. presentation  DUE
             VIEW VIDEO #7: Cephalopods: Incredible Suckers (Check out for Home viewing)

FEB  2 F   Last day for student/faculty initiated withdrawal, Student
             & Faculty initiated drops and 50% refunds

FEB  5 M  LECTURE:  Read  Ch. 2
             Plankton and Plankton Communities
             Phyto- and Zooplankton
             Floatation Mechanisms
             VIEW VIDEO #3: Season in the Sea (Check out for Home viewing)

FEB  7 W  LECTURE:  Read  Ch. 2
             Plankton and Plankton Communities
             Primary Productivity of the Biosphere
             SCIENTIFIC PAPER CRITIQUE 2 w/ 3min. presentation  DUE
             LECTURE/LABORATORY EXAM 1 Review Sheet  HO

FEB 12 M  LECTURE/LABORATORY:
             Plankton and Plankton Communities
             Factors Affecting Primary Production
             The Ocean Ecosystem:
             The Classic Model & A Changing Model

FEB 14 W  LECTURE/LABORATORY EXAM 1  Chpts 1 & 2
             Protostomes and Deuterostomes,
             and ZOOplankton (Larvae)

FEB 15 F  LAST DAY TO APPLY FOR SPRING 2003 GRADUATION
             and deadline to apply for privately funded scholarships

FEB 19 M  LECTURE/LABORATORY:
             EXAM 1 return
             PHYTOplankton: The Micro- and Macro- Algae
             (Protista & Plantae)

FEB 21 W  LECTURE:  Read  Ch. 4
             Deep-Sea Biology
             Zonation
Sampling the Deep Sea  
Environmental Characteristics  

**SCIENTIFIC PAPER CRITIQUE 3 w/ 3min. presentation DUE**

**FEB 23 F**  
*Low grade reports for Freshman due!*

**FEB 26 M**  
LECTURE:  
Adaptations of Deep-Sea Organisms  
Community Ecology of the Benthos  
Mid-water Community Ecology  

**VIEW VIDEO #4: Deep Sea (Check out for Home viewing)**

**FEB 28 W**  
LECTURE:  
Read  
**Oceanic Nekton**  
Adaptations of Oceanic Nekton  
Ecology of Nekton  

**SCIENTIFIC PAPER CRITIQUE 4 w/ 3min. presentation DUE**

**MAR 5 M**  
LECTURE:  
Read  
**Shallow-Water Subtidal Benthic Associations**  
Environmental Conditions  
Unvegetated Sedimentary Environments  
Rocky Subtidal Communities  

**MAR 7 W**  
LECTURE:  
Ch. 5  
Kelp Beds and Forests  
Seagrass Communities  
Special Communities  

**SCIENTIFIC PAPER CRITIQUE 5 w/ 3min. presentation DUE**

**LECTURE/LABORATORY EXAM 2 Review Sheet**  
HO

**MAR 10-18**  
**SPRING BREAK**

**MAR 19 M**  
LECTURE:  
Read  
**Meiofauna**  
Environmental Characteristics, Adaptations & Ecology  
Composition of Interstitial Assemblages  
Sampling and Extracting  

**MAR 21 W**  
LECTURE:  
Read  
**Tropical Communities**  
Coral Reefs  

**VIEW VIDEO #5: Under the Emerald Sea (Check out for Home viewing)**

**MAR 23 F**  
*Last day for Student/Faculty initiated withdrawals with “W” grade*

**MAR 26 M**  
LECTURE:  
Read  
Ch. 9
Coral Reefs cont.
Mangrove Forests

**VIEW VIDEO #6: Treasures of the Great Barrier Reef**
(Check out for Home viewing)

**MAR 28 W**
LEcTURE:
LEcTURE/LABORATORY EXAM 2
Chpts. 4, 3, 5, 7, & PHYTOplankton (Algae)

**APR 2 M**
LEcTURE:
*Intertidal Ecology*
Environmental Conditions
Adaptations of Intertidal Organisms

**APR 4 W**
*Registration and fee payment for Fall semester 2005 begins*
LEcTURE:
Rocky Shores
Sandy Shores
Muddy Shores

**COlLOQUIUM TIME SLOT**
SIGN ups

**APR 9 M**
LEcTURE:
*Estuaries and Salt Marshes*
Types of Estuaries
Physical Characteristics
Biota of Estuaries

**APR 11 W**
LEcTURE:
*Estuaries and Salt Marshes*
Adaptations of Estuarine Organisms
Ecology of Estuaries
Salt Marshes

**APR 16 M**
LEcTURE:
*Symbiotic Relationships*
Symbioses of Algae and Animals
Symbioses among Animals

**COlLOQUIUM ABSTRACT DUE**
FOR EC!

**APR 18 W**
LEcTURE:
*Human Impact on the Sea*
Fisheries
Mariculture
Pollution
Drugs from the Sea
Global Warming and Sea Level
### Colloquium Abstract Due

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>LECTURE/LABORATORY EXAM 3 Review Sheet</td>
<td>Chpts. 6,8,9,10,11</td>
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<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>APR 23 M</td>
<td><strong>LECTURE EXAM 3</strong> (our “final”)</td>
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<tr>
<td>APR 25 W</td>
<td>11th MARINE BIOLOGY COLLOQUIUM <strong>15 min. student presentations</strong></td>
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<td>Sessions 1 &amp; 2.</td>
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<td>APR 27 F</td>
<td>Nanook SpringFest, No Classes:</td>
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<tr>
<td>APR 30 M</td>
<td>11th MARINE BIOLOGY COLLOQUIUM <strong>15 min. student presentations</strong></td>
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<td>Sessions 3 &amp; 4</td>
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<td>MAY 2 W</td>
<td>Dr. L. is on travel. No class today!</td>
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<td>MAY 7 F</td>
<td>LAST DAY OF INSTRUCTION &amp; Course Evaluation</td>
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<td>11th MARINE BIOLOGY COLLOQUIUM <strong>15 min. student presentation</strong></td>
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<td><strong>Completions if need be.</strong></td>
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<td>Marine Biology <strong>Phyla Feeding Frenzy: Fishes and Loaves</strong></td>
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<td>Location to be announced, 6 p.m.</td>
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<tr>
<td>MAY 9-12</td>
<td><strong>FINALS</strong> (See Apr. 23rd)</td>
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<td>MAY 13 S</td>
<td><strong>COMMENCEMENT</strong></td>
</tr>
<tr>
<td>MAY 16 W</td>
<td>Spring Semester grades DUE to Registrar</td>
</tr>
</tbody>
</table>

### VIDEOS:
- View at your own discretion, in the lab. or check out for take-home viewing in the comfort of your own dwelling. See suggested Syllabus viewing dates blocks.
  - **Don’t forget the popcorn!**
    1. Miracle Planet
    2. In Search of the Giant Squid
    3. Season in the Sea
    4. Deep Sea
    5. Under the Emerald Sea
    6. Treasures of the Great Barrier Reef
    7. Cephalopods: Incredible Suckers