BIOLOGY OF MARINE ORGANISMS
BIOLOGY F328
33255-F01-S2000

INSTRUCTOR: Gary A. Laursen, Ph.D. Office: 305A Bunnell
e-mail: ffgal@aurora.alaska.edu Phone: 474-6295

(ALSO ON RESERVE)


See also the SUPPLEMENTAL READINGS
(ALSO ON RESERVE)


LECTURE: 8-9:30 pm M & W, 313 Bunnell
Meets ORAL communication intensive requirement

PREREQUISITES: Upper division standing in a biologically oriented major
Biol. 105/106 knowledge level assumed.

COURSE DESCRIPTION:

Marine Biology is designed to provide an in-depth INTRODUCTION to the field of Marine
Biology, in the broad sense, for the mid-level undergraduate student with interests in marine
biological and oceanographic sciences. Assumed is a minimum background in basic chemical,
physical, and biological sciences, but certainly no more than would be obtained from introductory
‘100’ level courses. Familiarity with the major invertebrate phyla would be helpful, but not
necessary. Some acquaintance with basic ecological concepts will also be helpful but, if lacking,
may be obtained from primary and supplemental readings in ecology.

Our focus will place emphasis on those ECOLOGICAL PROCESSES and
ADAPTATIONS that act to structure marine associations, ocean habitat, distribution,
classification, and functional morphology of organisms that permit their persistence through time.
The 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, the relative proximity to marine systems, and
the time of year, simply do not lend themselves to a strong field or laboratory orientation. The 90-
min. class meeting times will allow for the use of traditional lectures supplemented with
audiovisuals such as 35 mm color slides, VHS videos, occasional films, abundant overhead
projections, preserved specimens, and ‘thematic labs’ (e.g., larvae, animal phyla, marine algae),
and project oriented "laboratories". It is the intent of this instructor to duplicate our formal NOTE
set 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 ample opportunity to “search the literature” through supplemental
READINGS, to make CRITIQUES from marine literature on subjects of interest (see the potential
critique subject listing) through library literature sources, to write by developing an ABSTRACT on a literature research project of interest, and preparing that information for dissemination to the class in an oral presentation made at the 7th MARINE BIOLOGY COLLOQUIUM to be conducted at the end of our course.

GRADING:

Earned grades will be based on total points (ca. 575) received from FOUR lecture EXAMS, Five SCIENTIFIC PAPER CRITIQUES, the ABSTRACT and PRESENTATION for our end of semester Sixth Marine Biology Colloquium.

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 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:

\[
\begin{align*}
A &= 92-100+ \% \\
B &= 82-91 \% \\
C &= 72-81 \% \\
D &= 65-71 \% \\
F &= 0-64 \%
\end{align*}
\]

Point distributions will be made approximately as follows:

<table>
<thead>
<tr>
<th>POINTS</th>
<th>TASK</th>
<th>CHAPTERS</th>
<th>DATES</th>
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<tr>
<td>25</td>
<td>Sci. Paper Critique 1</td>
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<td>125</td>
<td>Lecture Exam 1</td>
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<td>Sci. Paper Critique 2</td>
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<td>7 &amp; 8</td>
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<td>Mar. 6</td>
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<td>Mar. 27</td>
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<td>Lecture Exam 3</td>
<td>6, 8 &amp; 9</td>
<td>Mar. 29</td>
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<tr>
<td>25</td>
<td>Sci. Paper Critique 5</td>
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<td>Apr. 10</td>
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<td>25</td>
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<td>Apr. 17</td>
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<td>3, 6, (9) &amp; 11-14</td>
<td>Apr. 19</td>
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<td>50</td>
<td>Colloquium Presentations</td>
<td></td>
<td>Apr. 24, 26</td>
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700 TOTAL COURSE POINTS
This instructor also reserves the right to include 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 the outcome of SEMESTER grades very dramatically. Platonic discourse and questioning strategies are used such that this class will be discussional! KEEP UP WITH THE READINGS!
# Biology of Marine Organisms
## Lecture Schedule

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC OF DISCUSSION</th>
<th>ASSIGNMENT</th>
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<tbody>
<tr>
<td>JAN 13  R</td>
<td><strong>FIRST DAY OF INSTRUCTION:</strong> Late registration begins</td>
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<tr>
<td>JAN 17  M</td>
<td><em>Alaska Civil Rights Day</em></td>
<td>No class</td>
</tr>
<tr>
<td>JAN 19  W</td>
<td>LECTURE: <em>INTRODUCTION to Biology of Marine Organisms</em></td>
<td>Read Ch. 1</td>
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<tr>
<td></td>
<td>Syllabus</td>
<td>(HO)</td>
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<tr>
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<td>Lecture Notes Sales</td>
<td>$10</td>
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<td>Scientific Paper Critiques</td>
<td>Topics (HO)</td>
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<td></td>
<td>Marine Biology Colloquium</td>
<td>(HO)</td>
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<tr>
<td></td>
<td><strong>The Marine Environment</strong></td>
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<td></td>
<td>Divisions of the Marine Environment</td>
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<tr>
<td></td>
<td>Basic Oceanography</td>
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<td>JAN 21  F</td>
<td><em>Last day for late registration and fee payment</em></td>
<td></td>
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<tr>
<td>JAN 24  M</td>
<td>LECTURE: <em>Ecological Principles</em></td>
<td>Ch. 1</td>
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<tr>
<td></td>
<td>Larvae and Larval Ecology</td>
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<td>JAN 26  W</td>
<td>LECTURE: <em>Properties of Water</em></td>
<td>Ch. 1</td>
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<tr>
<td></td>
<td>Comparisons of Terrestrial and Marine Ecosystems</td>
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<tr>
<td>JAN 28  F</td>
<td><em>Last day for student/faculty initiated withdrawals and 50% tuition refunds</em></td>
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<tr>
<td>JAN 31  M</td>
<td>LECTURE: <em>Plankton and Plankton Communities</em></td>
<td>Read Ch. 2</td>
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<tr>
<td></td>
<td>Phyto- and Zooplankton</td>
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<tr>
<td></td>
<td>Floatation Mechanisms</td>
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<td></td>
<td><strong>SCIENTIFIC PAPER CRITIQUE 1</strong></td>
<td>DUE</td>
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<tr>
<td>FEB 2   W</td>
<td>LECTURE: <em>Primary Productivity</em></td>
<td>Ch. 2</td>
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<tr>
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<td>Factors Affecting Primary Production</td>
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<tr>
<td></td>
<td>The Ocean Ecosystem: A Changing Model</td>
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<tr>
<td>FEB 7   M</td>
<td>LECTURE EXAM 1</td>
<td>Chapters 1 &amp; 2</td>
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<tr>
<td>FEB 9   W</td>
<td>LECTURE: <em>Deep-Sea Biology</em></td>
<td>Read Ch. 4</td>
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<td>Zonation</td>
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<tr>
<td></td>
<td>Sampling the Deep Sea</td>
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<tr>
<td></td>
<td>Environmental Characteristics</td>
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FEB 14 M  LECTURE:  
Adaptations of Deep-Sea Organisms  
Community Ecology of the Benthos  
Mid-water Community Ecology  
Ch. 4

FEB 15 T  LAST DAY TO APPLY FOR SPRING GRADUATION

FEB 16 W  LECTURE:  
Shallow-Water Subtidal Benthic Associations  
Environmental Conditions  
Unvegetated Sedimentary Environments  
Rocky Subtidal Communities  
SCIENTIFIC PAPER CRITIQUE 2  DUE  
Read Ch. 5

FEB 18 F  Low grade reports for Freshman due!

FEB 21 M  LECTURE:  
Kelp Beds and Forests  
Seagrass Communities  
Special Communities  
Ch. 5

FEB 23 W  LECTURE:  
Meiofauna  
Environmental Characteristics, Adaptations & Ecology  
Composition of Interstitial Assemblages  
Sampling and Extracting  
Ch. 7

FEB 28 M  LECTURE EXAM 2  
Chapters 4, 5, & 7

MAR  1 W  LECTURE:  
Tropical Communities  
Coral Reefs  
Read Ch. 9

MAR  6 M  LECTURE:  
Coral Reefs cont.  
Mangrove Forests  
SCIENTIFIC PAPER CRITIQUE 3  DUE  
Ch. 9

MAR  8 W  LECTURE:  
Estuaries and Salt Marshes  
Types of Estuaries  
Physical Characteristics  
Biota of Estuaries  
Read Ch. 8

MAR 10 F  Last day for Student/Faculty initiated withdrawals with "W" grade

MAR 11-19  SPRING BREAK

MAR 20 M  LECTURE:  
Ch. 8
Adaptations of Estuarine Organisms
Ecology of Estuaries
Salt Marshes

MAR 22 W LECTURE:
Intertidal Ecology
Environmental Conditions
Adaptations of Intertidal Organisms
Rocky Shores

MAR 27 M LECTURE:
Sandy Shores
Muddy Shores

SCIENTIFIC PAPER CRITIQUE 4

MAR 29 W LECTURE EXAM 3

APR 3 M LECTURE:
Symbiotic Relationships
Symbioses of Algae and Animals
Symbioses Among Animals
Registration for Fall semester 2000 begins

APR 5 W LECTURE:
Oceanic Nekton
Adaptations of Oceanic Nekton
Ecology of Nekton

APR 10 M LECTURE:
Marine Animal Phyla
Colonials
Protostomes

SCIENTIFIC PAPER CRITIQUE 5

APR 12 W LECTURE:
Deuterostomes

APR 17 M LECTURE:
Human Impact on the Sea
Fisheries
Mariculture
Pollution
Drugs from the Sea
Global Warming and Sea Level

APR 19 W LECTURE EXAM 4

APR 21 F All Campus Day, No Classes

Read Ch. 6
Ch. 6
Chapters 6, 8 & 9
Read Ch. 10
Read Chpts. 3
Ch. 3
Chapters 3, 10, & 11


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<thead>
<tr>
<th>Date</th>
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<tr>
<td>APR 24</td>
<td>7th MARINE BIOLOGY COLLOQUIUM</td>
<td>10 min. student presentations</td>
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<tr>
<td>APR 26</td>
<td>7th MARINE BIOLOGY COLLOQUIUM</td>
<td>10 min. student presentations</td>
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<td>MAY 1</td>
<td>7th MARINE BIOLOGY COLLOQUIUM</td>
<td>10 min. student presentations</td>
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<td>MAY 3-6</td>
<td>FINALS</td>
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<td>MAY 7</td>
<td>COMMENCEMENT</td>
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MARINE BIOLOGY COLLOQUIUM
ABSTRACTABLE SUBJECTS
BIOL. 328
DR. G. LAURSEN

Abyss
Abyssal plain
Advection currents
Alginites/agar/carragenin
Alkalinity
Alternation of generations
Anadromy
Any animal group (taxon)
Aphotic zone/zonation
Aquaculture
Atolls
Bacterioplankton
Bathyscape
Bends
Benthic
Bioluminescence
BOD
Buffering of seawater
Cellulose decomposition
Chemoautotrophs
Chitin
Chlorophyll of protists and plants
Ciguatera
Circadian rhythms
Coccolithophores
Commensalism
Compensation depth
Competitive exclusion/interference
Competition
Conductivity
Continental drift
Continental shelf/slope
Copepods
Coriolis force
Cropperism
Cryptic coloration
Currents
Cypris larvac
Density
Di(y) sphytic zone
Diatoms
Dinoflagellates
Disturbance theory
DOM
Echolocation
Ectothermia
El Nino
Elutriation feeding
EMR (electromagnetic rad. spect.)
Endothermia
Endozoites
Energy transfer
Enzymes
Epiphytes
Estuaries
Euphotic zone
Euryhaline adaptations
Fecundity
Femtoplankton
Fjords
Food chain
Food webs
Fugitive species
Gametophytic adaptations
Gorgonians
Grab techniques
Grazers
Gyres
Hadal depths (<6000m)
Halophytes
Heat of vaporization, fusion, specific heat
Herbivore
Homiotherms
Host associations
Hydrodynamics
Hydrothermal vents
Hypothermia
Infauna
Interzonal fauna
Ionization
Kelp beds/forests
Keystone species
Krill
Lagoons
Law of the minimum
Light (4-700 nm)
Lipids and storage
Lophophore larvae
Luciferin/luciferase reactions
Macrofauna
Macroplankton
Mangroves
Mariculture
Marine snow
Mimicry
Minimata (Hg) disease
Mining (Mg)  
Nauplius larvae  
Nekton  
Nitrogen narcosis  
Osmoregulation  
Ovi, ovovi, and vi-vipari  
Parasitism  
Parthenogenesis  
Perigee  
PH  
Pheromones  
Photophores  
Photosynthesis  
Phototaxis  
Photrophism  
Pigments, photo-, etc.  
Plankton (phyto-, pico-, micro-,  
mero-, mega-, nano-, net,  
macro-, halo-, femto-)  
Planula larvae  
Pneumatocysts  
POC  
Poikilotherms  
Pollution  
Polygyny  
Polynya  
Predator/prey relationships  
Psammon organisms  
Red tide  
Rete mirabile  
Rhodopsin  
Salinity  
Salt marsh  
Scales  
Scavengers  
SCUBA  
Sea floor spreading  
Sea grasses  
Seamounts  
Seasonal succession  
Silicoflagellates  
Sonar  
Spermaceti organ  
Sporophytes  
Stenohaline organisms  
Subsidence theory  
Succession  
Surface tension  
Symbionts  
Symmetry  
Tectonics  
Terrigenous sediments  
Thermal pollution  
Thigmotaxis  
Tidepools  
Tides  
Toxins  
Trace elements  
Trenches  
Trochophore larvae  
Trophic levels/types/zones  
Tsunami  
Turbidity  
Turnover  
Veliger larvae  
Vertical migration  
Wave action  
Zonation (littoral, etc.)  
Zooplankton
JOURNALS OF MARINE BIOLOGY
Biology 328
Dr. G. Laursen

The following is a list of some but not all of the journals found on campus that have papers on marine biological subjects. This isn’t a complete list, but it will get you started. Search both the Rasmussen and AHRB/Bio.Med. Libraries.

American Zoologist (some symposia on marine subjects)
Aquaculture (applied)
Aquatic Botany
Australian Journal of Estuarine and Freshwater Science
Biological Bulletin, Woods Hole
Bulletin of the Japanese Society for Scientific Fisheries
Bulletin of Marine Science (tropical emphasis)
Canadian Journal of Fisheries and Aquatic Science (1/2 marine)
Canadian Journal of Zoology
Copeia (fish, reptiles, amphibians; some marine)
Deep Sea Research
Environmental Biology of Fishes
Estuarine and Coastal Marine Science
Fishery Bulletin, USFWS
Helgolander Meeresuntersuchungen (German, European emphasis)
Hydrobiological Journal (USSR, in English, mostly freshwater)
Internationale Revue der Gesamten Hydrobiologie
Journal of Animal Ecology (some marine papers)
Journal du Conseil International Exploration Mer (fishery)
Journal of Crustacean Biology
Journal of Experimental Marine Biology and Ecology
Journal of Fish Biology (British, European primarily)
Journal of Ichthyology (USSR, English translation)
Journal of Marine Biological Association, United Kingdom
Journal of Marine Research (oceanographic emphasis)
Journal of Plankton Research
Limnology and Oceanography (nutrients, plankton and more)
Marine Biology
Marine Ecology
Marine Ecology Progress Series
Marine Fisheries Review (US, National Marine Fisheries Service)
Marine Pollution Bulletin
Netherlands Journal of Sea Research
Opehelia (European, invert emphasis)
Polar Biology
Sarsia (European, invert emphasis)
Soviet Journal of Marine Biology (English translation)
Transactions of the American Fisheries Society
### MARINE BIOLOGY
### ABSTRACT AND COLLOQUIUM PRESENTATION
### GRADING FORM

<table>
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<tr>
<th>NAME</th>
<th>TOTAL POINTS</th>
<th>75 pts.</th>
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**GRADING CRITERIA:**

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<th>ACHIEVEDPTS.</th>
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**ABSTRACT (30 Pts.)**

**Timeliness**

\[5 pts.\]  

**Preparation**

**Title**

\[5 pts.\]  

**Body**

\[10 pts.\]  

**Key Words**

\[5 pts.\]  

**Lit. Cit.**

\[5 pts.\]  

**PRESENTATION (45 pts.)**

**TIME:** START: Finish_____

**Subject Preparation**

\[5 pts.\]  

**Delivery Preparation**

\[20 pts.\]  

**Notes**

**Slides**

**Overheads**

**Handouts**

**Specimens**

**Delivery**

\[20 pts.\]  

**Poise**

**Voice audible**

**Knowledge base**

**Time (10 min.)**

**TOTAL POINTS**

\[75 pts.\]  

**COMMENTS-NOTES:**
BILOGY 328  
RESERVE READING LIST  
Dr. G. Laursen

Chapter 1  


Chapter 2  


Chapter 3  


Chapter 4  


Chapter 5  


Chapter 6


Chapter 7


Chapter 8


Chapter 9


Chapter 10
Limbaugh, Conrad. (1961). Cleaning symbiosis: the invasion of the oceans by skin-diving biologists has led to the discovery that a surprisingly large number of marine organisms either live by cleaning other marine organisms or benefit by being cleaned. Scientific American, Vol. 205(2), August pp. 42-49.

Chapter 11