MARINE BIOLOGY LABORATORY
MARS 2063

HAWAII PACIFIC UNIVERSITY
WINDWARD CAMPUS
FALL SEMESTER, 2011

TIME: 7:30-11:30AM
DAY: TUESDAY
ROOM: AC 102B

INSTRUCTOR

Dr. Kimberly Andrews
Office hours: by appointment
Email: kimandrews@gmail.com

TEXTS:

Hoover, J. P. (1998) Hawai'i's Sea Creatures. A guide to Hawai'i's Marine Invertebrates. Mutual Publishing, Honolulu, 366 pp.
Randall, J. E. (1996) Shore fishes of Hawai'i. Natural World Press, Vida Oregon, 216 pp.
Lab notebook: *Experimental Research Notebook for Scientists and Engineers*
You are required to have your textbooks & lab notebook at each class meeting.

COURSE DESCRIPTION: This course is the laboratory and field component of Marine Biology MARS 2062
Prerequisites: BIOL 2053, MARS 1020, and concurrent enrollment in Marine Biology MARS 2062

NOTE: If you are not a strong swimmer or have a condition that may interfere with your ability to swim (asthma, heart arrhythmia, fear of sharks, etc.), you can still participate in field labs but let me know immediately.

COURSE GOALS: After completing this course, students will be able to:

- Apply the scientific method within the field of Marine Biology, including the communication of scientific work in both oral and written forms
- Use a variety of sampling, measurement, and data analysis techniques commonly used for field and laboratory work in marine biology
- Identify local marine organisms

GRADING:

	PERCENT OF GRADE
Lab notebook (12 X 10 points)	10%
Worksheets:	25%
Journal article worksheets (6 X 10 pts)	
Research worksheets (7 X 10 pts)	
Oral Presentations:	15%
Brief project description presentation (5pts)	
Research proposal presentation (100 pts)	
Final research presentation (100 pts)	
Papers:	30%
Research Proposal *draft* (20 pts)	
Research Proposal (50 pts)	
Research Paper *draft* (40 pts)	
Final research paper (100 pts)	
Peer reviews:	5%
proposal peer review (10 pts)	
final paper peer review (10 pts)	
Species ID exam (2 X 50 pts)	10%
Class participation (10 pts)	5%

FIELD & LABORATORY NOTEBOOK

A well-written, up-to-date, accurate, and concise field/laboratory notebook is essential to the success of any scientific endeavor. You must use the special notebook that is available at the Windward Campus bookstore (*Experimental Research Notebook for Scientists and Engineers*). You should use this notebook to keep a permanent record of all of the work you do as part of scheduled field/laboratory exercises.

Notebook entries for laboratory meetings:

- Date and time
- Objective of the day's class
- Methods of analysis
- data
- General observations, drawings of organisms
- Pearls of wisdom from the professor…..take note of what I say.

Notebook entries for field meetings:

- Date and time of trip
- Objective of the day's class
- Location (latitude and longitude) of field site and directions to the field site
- Weather and sea-state
- Safety precautions
- Map of study area, for intertidal trips indicate the types of substrate and where plants and animals are found
- Lists of organisms identified in the field
- General observations
- Pearls of wisdom from the professor…..take note of what I say.

You will turn your notebook in at the end of each lab meeting. It will be graded and given back to you at the beginning of the next meeting. Your notebooks will be evaluated for **detail, organization,** and **legibility.** Make use of your time in class wisely. Put both time and thought into it!

RESEARCH PROJECT

In this course, you will engage in the process of scientific inquiry by conducting an independent research project. Your project will involve all aspects of the scientific process, including observations, generation of hypotheses, experimental design, data analysis and interpretation, and communication of your results to your peers. At the beginning of the semester, you will be assigned into one of three research groups (four students / group), and each group will work together on a specific research project throughout the semester. Your work will culminate in oral and written presentations of your research toward the end of the semester. Each group will also aid the other groups by helping to collect data for other groups' projects throughout the semester.

WORKSHEETS

Journal Article Worksheets: Throughout the semester you will be reading several peer-reviewed scientific journal articles and will discuss these articles with your research group and with the class. You will complete and submit worksheets which will have questions pertaining to these journal articles. These worksheets will stimulate group discussion and will be used by the instructor to evaluate your understanding of the articles.

Research Project Worksheets: For each research project conducted in this class (whether it is your group's project or another group's project), you will complete and submit one or two worksheets that will involve short essays, data analysis, and/or other activities related to the research project.

ORAL PRESENTATIONS

Brief project description presentation (~5 minutes): Each research group will present a short description of their research project prior to the fieldwork component of their research. This will prepare the rest of the class to be good field-assistants by helping them understand the goals and field methods of the research project.

Research proposal presentation (~15 minutes): Each research group will give an oral presentation of their proposed research mid-semester.

Final research presentation (~20 minutes): During Final's week, each research group will give an oral presentation of their research.

PAPERS

Research proposal: Each individual will write a research proposal regarding their group research project (1500 words minimum, excluding literature cited). You will lose points if you do not follow the suggested changes from peer review and/or instructor review of your first draft. The required format for this report will be that used by most scientists for research proposals. More detailed information on this format will be distributed later in the semester.

Research paper: Each individual will write a scientific paper regarding their research project (1900 words minimum, excluding literature cited). You will lose points if you do not follow the suggested changes from peer review and/or instructor review of your first draft. The required format for this report will be that used by most scientists for publication of their research in the primary scientific literature (Title, Abstract, Introduction, Methods, Results, Discussion, Literature Cited). More detailed information on this format will be distributed later in the semester.

PEER REVIEWS

You will evaluate drafts of other students' research proposals and research papers, and you will provide suggestions for improvement. You will be graded based on the quality of your evaluation and suggestions.

SPECIES ID EXAMS

You will take two exams in which you will be required to identify marine organisms by their scientific names. The first exam will occur near the beginning of the semester and will cover organisms that you will be required to identify during our field research. The second exam will occur near the end of the semester and will cover additional organisms.

PARTICIPATION

Group participation: Toward the beginning of the semester, each group will write a contract outlining the expectations for each group member. Toward the end of the semester, group members will anonymously evaluate each other. This evaluation will be considered by the instructor in your class participation grade

Class participation: The instructor will assign a class participation grade to each individual based on punctuality, contribution to group/class discussions, work ethic, attitude, and group members' evaluations.

ATTENDANCE

Each unexcused absence may result in a 10% deduction from your final grade. Absences due to documented medical emergencies (a note from your physician indicating that you are too ill to attend classes) are excused; however the notebook entry and other homework is not (a make-up assignment will be required for all excused absences). Students with more than three absences, documented or undocumented, will be dropped from the course.

ACADEMIC HONESTY

Plagiarism or any other form of academic dishonesty will result in a zero on the assignment, an "FD" in the course, or expulsion from the University for everyone involved. The grade of FD represents an F for academic dishonesty and it will remain a permanent part of your academic record, not subject to HPU's normal retake policy.

COMING TO CLASS LATE

DON'T !!! Coming to class late is disruptive and inconsiderate to your instructors and to your fellow students in the course. Class starts exactly at the scheduled time. For field exercises, the van will depart no more than five minutes after the scheduled start time.

Blackboard

Access Blackboard through the campus pipeline.

Field Gear:

- Have your field guides, lab notebook, and a pencil with you always.
- Bring a swim suit, mask, snorkel, fins and towel to labs which will involve swimming. Additionally, you may want to bring a waterproof watch, a wetsuit or rashguard, dry clothes, sunglasses, sunscreen, hat, water and snacks.
- You need to wear close-toed shoes whenever we are in the lab. You are free to wear whatever shoes you want in the field EXCEPT if/when we go tidepooling: please wear tabis, dive booties or old shoes with good traction on wet rocks.

Laboratory and Field Schedule:

Week	Date	Location	Topic	Homework due
1	9/6/2011	Coconut Island	Generate hypotheses & design experiments	
2	9/13/2011	Kaholo/lab	1. Project 1 Field Research Trip (Plankton tow) 2. GROUP 1 BRIEF PROJECT DESCRIPTION (ORAL)	
3	9/20/2011	Lab	1. Plankton analysis: counts, DNA extraction 2. Journal article discussion 3. GROUP 2 BRIEF PROJECT DESCRIPTION (ORAL)	Journal Article worksheet #1
4	9/27/2011	Lab	1. Plankton analyses: DNA extraction , PCR 2. Journal article discussion 3. GROUP 3 BRIEF PROJECT DESCRIPTION (ORAL)	Research Worksheet #1 (Project 1) Journal Article worksheet #2
5	10/4/2011	Lab	1. Plankton analysis: Gel, PCR cleanup 2. Journal article discussion 3. SPECIES ID EXAM #1	1. Proposal draft 2. Journal Article worksheet #3
6	10/11/2011	Kaholo	Project 2 Field Research Trip #1	1. Proposal peer review 2. Research Worksheet #2 (Project 1)
7	10/18/2011	Lab	1. Data analysis: Plankton sequence analysis, Project 2 analysis 2. Journal article discussion 3. Visiting scientist	1. Final Proposal 2. Journal Article worksheet #4
8	10/25/2011	Vans	Project 3 Field Research Trip #1	Research worksheet #3 (Project 2)
9	11/1/2011	Lab	1. Data analysis 2. Journal article discussion 3. RESEARCH PROPOSALS (ORAL)	Journal Article worksheet #5
10	11/8/2011	Vans	Project 3 Field Research Trip #2	Research worksheet #4 (Project 3)
11	11/15/2011	Kaholo	Project 2 Field Research Trip #2	
12	11/22/2011	Lab	1. Data analysis 2. Journal article discussion 3. Visiting scientist	Journal Article worksheet #6
13	11/29/2011	Lab	1. Fouling plates 2. Journal article discussion 3. Visiting scientist	1. Final paper draft 2. Research worksheets #5 & #6 (Projects 2 & 3)
14	12/6/2011	Lab	1.SPECIES ID EXAM #2 2. Journal article discussion	1. Research paper peer review 2. Journal Article worksheet #7 3. Research worksheet #7 (fouling)
Finals week		Lab	FINAL RESEARCH PRESENATIONS (ORAL)	Final research paper

The following lists include invertebrates and fishes that you will be expected to be able to identify by scientific name (full binomen) from slides during the second species ID exam.

Pocillopora meandrina
Montipora capitata
Montipora flabellata
Porites lobata
Porites compressa
Nerita picea
Littoraria pintado
Serpulorbis variabilis
Cypraea caputserpentis
Conus imperialis
Aplysia dactylomela
Pseudosquilla ciliata
Panulirus marginatus
Calcinus laevimanus
Grapsus tenuicrustatus
Linckia multifora
Colobocentrotus atratus
Echinothrix calamaris
Holothuria atra

Lutjanus kasmira
Chlorurus perspicillatus
Bothus mancus
Coris gaimard
Rhinecanthus rectangulus
Acanthurus triostegus
Istiblennius zebra
Cephalopholis argus
Dascyllus albisella
Carcharhinus amblyrhynchos
Gymnothorax meleagris
Chaetodon lunula
Caranx melampygus
Diodon hystrix
Aulostomus chinensis
Parupeneus multifasciatus