

## Biology 471L, *Ecology*

**Term:** Spring 2012  
**Room:** Henry Lab 3  
**Credit:** 1 credits  
**Instructor:** Michael Dohm  
**Office:** Henry 6

**Days:** Friday  
**Time:** 2:30 – 5:20PM  
**Phone:** 739-8543 (x8543)  
**E-mail:** [mdohm@chaminade.edu](mailto:mdohm@chaminade.edu)  
**Office Hours:** M 10 – 11:30 AM; or by appointment

**Recommended textbook:** *Ecology*, 2<sup>nd</sup> edition by M.L. Cain, W.D. Bowman, & S.D. Hacker (Sinauer, ISBN: 978-0-87893-445-4). The lab course has **no required** textbook; materials provided by the instructor will constitute required reading material.

**Course website:** BI471L will have a Moodle website accessible via <http://letgen.org/chaminade>. Students may request printed copies of required materials; all graded materials will be made available via printed material upon request.

**Course description:** BI471L is a one semester introduction to how research is conducted in ecology. **Ecology** is the study of interactions among organisms and their environment. As such, the course is organized into five sub-disciplines of ecological study:

1. Organisms and their environment
2. Populations and individuals
3. Interactions among organisms
4. Communities
5. Ecosystems

These five units of inquiry describe study at different scales: from the individual to the entire biosphere. Because ecology is inseparably linked to evolution, we will also include discussions of evolutionary principles throughout the course. While we will discuss issues related to management of natural resources, this course is not primarily about environmental science. Environmental science is a sister discipline that incorporates concepts from ecology (and other natural science disciplines) and the social sciences. Instead, this course is about how ecologists investigate ecological processes by use of experiments and modeling.

**Course objectives:** This course will introduce students to the principles of energy flow across multiple levels of biological organization, how functional differences among individuals influence life history, how abiotic and biotic factors influence community structure and species distributions, and how different ecosystems contribute to regional and global processes. This course will also survey tools and experimental approaches ecologists use to answer ecological questions. On completion of this course, students will be expected to demonstrate an understanding of

1. Use of geographical information systems in ecology
2. The concept and assessment of niche space and energy budgets for an ectothermic vertebrate.
3. Activity metabolism and allometry.
4. How to sample populations.
5. Mark-recapture of individuals in a closed population.
6. Influences and connections between natural ecosystems and human populations.
7. How ecologists approach answering a particular ecological question with field work, experiments, or models.
8. How ecologists incorporate the scientific method to the study of natural ecosystems.

**Course requirements:** Grading will be based on student's points earned from a total of 400 points, divided into six short reports (15 points each), two exams (100 points each), and an Environmental Impact Statement (110 points).

- ✧ Short reports will be based on students' readings from the literature, questions posed by the worksheets and handouts, and are based on particular ecological problems. More details about reports will be given as needed to complete each assignment.
- ✧ Exams focus on worksheets, handout readings, reports and work done during labs. True/False, and short answer formats.
- ✧ There will be a larger report based on portions of an EIS for Chaminade. Graded materials include an outline, two drafts and a final written report plus a 20 minute seminar and PowerPoint presentation.

Additional details about all graded components will be provided in class at the appropriate time.

### Grading summary

What	When	What's it worth
<b>Six Reports 15 pts each</b>	Every 1-2 weeks	<b>90</b>
<b>Two Exams 100 pts each</b>	Exam 1, end of 5 <sup>th</sup> week Exam 2, end of 14 <sup>th</sup> week Exam 3, given on assigned final exam date	<b>200</b>
<b>EIS report</b>	Group grade assigned	<b>110</b>
<b>Total points =</b>		<b>400</b>

**Final grade:** Your letter grade will be based on the following point distribution.

Points earned	Percent of total	Letter grade
360 - 400	90 – 100%	A
320 - 359	80 – 89%	B
280 - 319	70 – 79%	C
240 - 279	60 – 69%	D
≤ 239	≤ 60%	F

### Reminders and notices:

- Class begins each time exactly at 1:30PM – please be on time. Chronic tardiness will be viewed as absence from class. Regular attendance is expected and essential for your progress in this class. Although our textbook is excellent, the text covers an enormous amount of information. The goal of lecture and discussion will be to provide the needed context to remove barriers to your understanding of the material.
- Use of music devices and cell phones is prohibited during all Natural Science and Mathematics classes at Chaminade, unless specifically permitted by your instructor. Use of cellphones and music devices in laboratories is a safety issue. In addition, use of cellphones and music devices in any class is discourteous and may lead to suspicion of academic misconduct. Students who cannot comply with this rule will be asked to leave class and may be subject to laboratory safety violation fines. Please refer any questions to the Dean of Natural Sciences and Mathematics.
- No make up exams will be granted in the event of an absence. If a student cannot attend a class in which an exam has been scheduled, the student must notify the instructor no later than the class prior to the scheduled exam. In the event of illness, a Doctor's note will be expected.
- You are encouraged to work together; however, all graded material must be your own. You are also expected to have read and to abide by the "Student Rules of Conduct" which are available in your copy of Chaminade University's Student Handbook.

5. Regarding accommodations for extra time or other requests about how exams are administered; Please be aware that I can only accommodate your requests if you have a documented ADA/AA agreement with Chaminade University on file at the Counseling Center. If you need to seek such accommodations, please contact Dr. June Yasuhara at 725-4845 or by e-mail at [jyasuhar@chaminade.edu](mailto:jyasuhar@chaminade.edu) as soon as possible.

#### Tentative\* Lab Schedule

<b>Dates</b>	<b>Week</b>	<b>Lecture Topic</b>	<b>Readings &amp; Handouts</b>
20 Jan	1	<ul style="list-style-type: none"> <li>• <b>Introduction &amp; Overview</b></li> <li>• <b>Environmental Impact Statements – Where do ecologists fit in?</b> <ul style="list-style-type: none"> <li>◦ A draft EIS for Chaminade</li> </ul> </li> <li>• <b>Dendrochronology</b> <ul style="list-style-type: none"> <li>◦ Lab report 1: associating tree rings to climate: due 27 Jan at start of class</li> </ul> </li> </ul>	Selected pages from Hawaii State Department of Health Administrative Rules, Chapter 200 Handout on dendrochronology Climate data: <a href="http://www.climate.washington.edu/climate.html">http://www.climate.washington.edu/climate.html</a>
27 Jan	2	<ul style="list-style-type: none"> <li>• <b>Models as a way to test biology hypotheses: Paper helicopters &amp; Seed dispersal</b> <ul style="list-style-type: none"> <li>◦ Lab report 2: Dimensions of seed dispersal by wind: due 3 Feb at start of class</li> </ul> </li> <li>• <b>Defining the niche space of a vertebrate ectotherm: lizards on campus</b></li> <li>• <b>GPS on campus</b></li> </ul>	Handout on niche Handout on lizards in Hawaii Handout on seed dispersal Handout on paper helicopters Handout on GPS
3 Feb	3	<ul style="list-style-type: none"> <li>• <b>GPS on campus, continued</b></li> <li>• <b>Energy as ecological currency: individual --&gt; population --&gt; community</b> <ul style="list-style-type: none"> <li>◦ Worksheet on energy budget calculations</li> </ul> </li> <li>• <b>Reptiles on campus: thermoregulatory behavior</b> <ul style="list-style-type: none"> <li>◦ Lab report 3: due 10 Feb</li> </ul> </li> </ul>	Handout on energy budgets & energy flow through ecosystem
10 Feb	4	<ul style="list-style-type: none"> <li>• <b>Survey of plants &amp; animals on campus</b></li> <li>• <b>Allometry of standard metabolism in goldfish</b></li> <li>• <b>Allometry of activity metabolism in gold fish</b> <ul style="list-style-type: none"> <li>◦ Lab report 4: Allometry of metabolism, due 20 Feb</li> </ul> </li> </ul>	Handout on allometry Plant and animal lists Statistics handout
17 Feb	5	<ul style="list-style-type: none"> <li>• <b>Survey of plants &amp; animals on campus</b></li> <li>• <b>Allometry of standard metabolism in goldfish</b></li> <li>• <b>Allometry of activity metabolism in gold fish</b> <ul style="list-style-type: none"> <li>◦ Lab report 4: Allometry of metabolism, due 20 Feb</li> </ul> </li> </ul>	Handout on allometry Plant and animal lists Statistics handout
24 Feb	6	<b>Exam 1</b>	
2 Mar	7	GIS software	GIS user guide

		Environmental impact worksheets Species and populations Native and non-native plants and animals Landscape features Mapping	GIS tutorial
9 Mar	8	Geographic Information System analysis continues	GIS user guide GIS tutorial
16 Mar	9	Environmental impact worksheets Species and populations Native and non-native plants and animals Landscape features Mapping Outline of EIS due 14 March (Report 5)	
23 Mar	10	Environmental impact worksheets Species and populations Native and non-native plants and animals Landscape features Mapping 1 <sup>st</sup> Draft EIS due 23 March (Report 6)	
26 – 30 Mar	11	<b>Spring Break</b>	
6 Apr	12	<b>4/6, Friday: Good Friday – No class</b>	
13 Apr	13	Analysis and writing of EIS	
20 Apr	14	<b>Exam 2</b>	
27 Apr	15	<b>2<sup>nd</sup> Draft EIS due</b>	
4 May	16	<b>EIS presentations</b> Wrap-up semester	

\*Schedule subject to change at discretion of instructor.