Bio. 471L-Ecology Laboratory — Spring 1999
Chaminade University of Honolulu — January 11, 1999 to
F, 2-4:50, 1 semester credit — May 6, 1999
Instructor: Ronald M. Iwamoto

**LABORATORY OUTLINE AND SYLLABUS**

LABORATORY MANUAL:

1. Brower, James E, Jerrold H. Zar, & Carl N. von Ende 1998. Field and Laboratory Methods for General Ecology. 4th. ed., William C. Brown Publishers, Dubuque, Iowa

LABORATORY GOALS: The laboratory is designed to fulfill the following objectives:

1. To present principal methods, as well as appropriate instruments, used in ecological field and laboratory work.

2. To examine applications of principles and concepts of lecture, such as in situ field trips to a sewage treatment plant and a recycling facility.

3. To identify, measure, and analyze ecological parameters related to the distribution of Hawaiian plants and animals in their habitats.

*OBJECTIVES* FOR *STUDENTS*: At the completion of the laboratory course, the students will be able to do the following:

1. Explain techniques of a particular ecological method, such as a transect and use suitable instruments, such as a decibel meter, psychrometer, and immunoassay spectrophotometer.

2. Discuss the applications of ecological principles demonstrated at field work sites and at facilities visited.

3. Identify, measure, and analyze specific ecological parameters in situ for Hawaiian plants and animals.

LABORATORY PREPARATION:

1. Attendance is mandatory and unexcused absences may not be made up. Excessive, unexcused absences will result in grade penalties to be determined by the instructor.

2. It is expected that student's prepare assignments prior to the laboratory. Hand-outs may be given for the laboratory.

3. Because field work and visits to facilities are dependent on climatic conditions and availability, laboratory exercises and field trips may be modified and adjusted.

**GRADE DETERMINATION:**

1. **The grade for the laboratory is a separate grade from the lecture grade.**

2. **Your grade will be** based **on the following:**

| | | | |
|---|---|---|---|
| **First Lab Exam** | **100 points** | Scale | **90% = A** |
| Second **Lab Exam** | 100 **points** | | **80% = B** |
| **Laboratory Notebook** | 100 **points** | | **70% = C** |
| **Quizes** | **50 points** | | **50% = D** |
| | **350 points** | | **below 50% = F** |

3. **There will be 10** extra **credit points on each lab** exam.

4. **Laboratory quizes, announced and unannounced, will be given.**

**LABORATORY NOTEBOOK:**

1. **Laboratory notebooks will be collected twice, at the time of of the laboratory exams. Please refer to instructions for the lab notebook on a separate hand-out.**

2. **The laboratory notebook may be checked periodically and graded to maintain current and up to date status.**

**POLICIES, CLASS STANDING, OFFICE HOURS AND EXTRA HELP:**

1. **Please refer to the lecture syllabus and outline as the same policies will be followed.**

**Bio. 471-Ecology** Mr. **R. Iwamoto**
**Chaminade University of Honolulu**

**ECOLOGY SUMMARIES AND LAB *NOTEBOOK***

Ecology Summaries:

1. **The objectives of the summaries are threefold:**
   a. **To read and report on cuurent topics in ecology;**
   b. **To offer an alternative to solely examination based grades;** and
   c. **To allow the student to develop researching articles and written skills as part of a university wide "Writing Across the Curriculum."**

2. **There will be five, one, full-page to two page, maximum limit, summaries. Each** summary **will be worth 10 points and will count toward the lecture grade.**

3. The **criteria for the summaries are as follows:**
   a. **They must be from a 1998 or 1999** publication from a newspaper, magazine, **or journal;**
   b. **The articles must be on scientific ecology, e.g., not on surfing waves or cellular and molecular biology.**
   c. **They must be word processed or typed following university writing standards;**
   d. **The summaries must include: author, title of article, date of publication, page no (s) ., and title of publication underlined or italicized, e.g., Honolulu Advertiser; and**
   e. **Please submit a xerox copy of the article with your summary, except from National Geographic, Hawaii Fishing News, Time, and Sports Illustrated;** *and*
   f. **Biology department policy will be followed on due dates, one grade level less for submission within 24 hours of the deadline and F grades for those 24 hours after the due deadline.**

**Laboratory Notebook:**

1. **The notebook may be spiral bound, a folder, or other notebook material. It is to include the following listed in a table of contents preceding the lab exercises:**
   a. **Title or topic of the lab exercise;**
   b. **Date of the exercise;** and
   c. **Page number (s), after numbering the pages in your notebook.**

2. **The notebook must include observations, drawings, recorded** physico-chemical **measurements, calculations, laboratory notes given to the class, and answers to questions asked on the hand-outs.**

3. **Lab hand-outs may be included, but is left to the discretion of the student.**

NOTEBOOK CONT'D...

4. Please do not write answers to questions *on the laboratory* hand-outs, nor laboratory notes. Separate pages are required *for* the above *or* points will be deducted.

5. Lab notebooks will be due at the time of the lab exams.

6. Examples will be available during the first week of instruction only.

CHAMINADE UNIVERSITY OF HONOLULU
Honolulu, Hawaii 96816

SRSSION: SPRING 1999
On Campus

**LABORATORY OUTLINE-SUBJECT TO CHANGE**

BIO 471L (1 CR) ECOLOGY LABORATORY MR. R. IWAMOTO
Dept. No. (# CRS) Title Instructor

| WEEK | DATE | ASSIGNMENTS |
|---|---|---|
| 1 | JAN 15 F | Introduction: Lab Syllabus & Outline<br>Hawaiian Natural History Videos;<br>1) Nova-"Hawaii", 1983<br>2) Nature-"Hawaii-Islands of the Fire Goddess", 1988<br>3) *National Geographic*-"Hawaii:Strangers in Paradise", 1991 |
| 2 | JAN 22 F | Instrumentation: Light, pH, temp., sound, humidity, soil, minerals, stratum, salinity refractometer, RPA I Spectrophotometer, and others Skim Unit 1 pp. 1-28 and Unit 2 pp. 29-39, 2b pp. 40-45, 2c pp. 46-53, 2d pp.54-62, and 2e pp. 55-76<br>Continue: Hawaiian Natural History Videos:<br>1) Discover-"The World of Science: Hawaii Edition", 1987<br>2) Hawaii-"Born of Fire", 1995<br>3) Dr. Ernest Reese, UH Manoa-"Monitoring Coral Reefs with Indicator Species", 1996 |
| 3 | JAN 29 F | Paiko Peninsula Quadrat Sampling and Monitoring Coral Reefs with Fish Transects<br>1) Quadrat & Transect Sampling<br>2) The Coral Reef Habitat and Physico-Chemical Measurements-refractometer, pH, and temp.<br>3) Bird Habitat and Conservation-Migratory Birds, Skim Unit 2f pp. 77-85, Unit 3 pp. 87 89, Emphasis on Unit 3a pp. 90-96, and Handouts on Paiko especially quadrat or plot-"Tropical Biotic Fringing Reefs as Ecological Laboratories" article, Emphasis on 3b pp. 97-102 transect sampling |

| | | |
|---|---|---|
| 4 | FEB 5 F | **Keaiwa Hieau State Park Aiea-Handouts on Hawaiian Medicine/Human Ecology/Medicinal Plants**<br>**1) Transect Sampling-3b pp. 97-102 review,**<br>**2) Dryland Forest in Hawaii-3h pp. 132-136**<br>**3) Plant Diversity**<br>**4) Soil Sampling-2c pp. 46-53** |
| 5 | FEB 12 F | **Population Methods:**<br>**1) Lincoln-Peterson Mark-Recapture Marking of Snails-3f pp. 124-127**<br>**2) Computer Programs of Population Analysis-Skim 4 pp. 137-170 on population analysis** |
| 6 | FEB 19 F | **1) Recapture Counts of Snails**<br>**2) Stream Coliform Testing-Membrane Filter Method-Handouts, 2d pp. 54-62**<br>**3) Herbicide & Pesticide Measurement-Demonstration of RPA I Spectrophotometer and ELISA Method** |
| 7 | **FEB 26 F** | **1)** Paiko Evening Transects-Night Dive<br>**Comparison of Diurnal/Nocturnal Environment & Organisms**<br>**2) Chemical Analysis-2e pp. 63-76** |
| 8 | **MAR 5 F** | **FIRST LAB EXAM AND LAB BOOKS DUE** |
| 9 | MAR 12 F | **Kaiwi Shoreline-Kaloko Cove**<br>**1) Community Diversity Indices-5b pp. 177-187, Skim 5 pp. 171-198**<br>**2) Estuarine Habitat**<br>**3) Endemic and Coastal Plant Adaptations**<br>**4) Ecological Succession-5d pp. 194-198**<br>**5) Conservation versus Development-possible position paper assignment** |
| 10 | **MAR 19 F** | **Freshwater (Palolo Stream), Estuarine (Ala Wai Canal, & Marine (Ala Moana) Productivity Measurements**<br>**1) Winkler Light/Dark Bottle Method-6b pp. 206-211, Skim 6 pp. 199-216** |

| | | | |
|---|---|---|---|
| 11 | MAR 22-26 | | SPRING RECESS, NO CLASSES |
| 12 | APR 2 | F | GOOD FRIDAY, NO CLASSES |
| 13 | APR 5 | M | LAST DAY TO WITHDRAW |
| | 6 | T | PREREGISTRATION FOR FALL 1999 |
| | 9 | F | 1) Sewage Treatment Plant Field Trip-Handouts<br>2) Water Quality Analysis Lake Wilson-Handouts |
| 14 | APR 16 | F | 1) H-Power Plant Field Trip-Handouts<br>2) Noise Testing at Plant, Decibel Meter-Handout |
| 15 | APR 23 | F | Marine Reef Structure and Plankton Sampling<br>1) Snorkeling Kaneohe Bay<br>2) Plankton Tows-3e pp. 115-123<br>or<br>Waiahole Valley Forest Ecosystem and Lotic Habitat<br>1) Stream Sampling & Endemic Shrimp/Fish-3e pp. 115-123<br>2) Forest Plants and Pest Plant, Clidemia |
| 16 | APR 30 | | SECOND LAB EXAM AND LAB BOOK DUE |

*IMPORTANT DATES:* *JAN 19 LAST DAY TO REGISTER/ADD/DROP CLASSES*

*APR 5 LAST DAY TO WITHDRAW*

*APR 6 PREREGISTRATION FOR FALL 1999*

Bio. 471-Ecology
Chaminade University of Honolulu
MWF 1-1:50, 3 semester credits
Instructor: Ronald M. Iwamoto

Spring 1999
January 11, 1999 to
May 6, 1999

**LECTURE SYLLABUS AND OUTLINE**

TEXT:

1. Brewer, Richard 1994. The Science of Ecology. Saunders College Publishing, New York, New York

LECTURE GOALS: The course is designed to fulfill the following goals

1. To present the basic principles and concepts of ecology.
2. To examine and analyze the interactions of organisms and environment using descriptive, functional, and evolutionary approaches.
3. To study the ecology of the fauna and flora of Hawaii.
4. To present the accomplishments, failures, contradictions, and possible direction of the ecological field. To aid in meeting this goal, examples and applications will be discussed.
5. To inform students of the facilities, organizations, and/or resources of an ecological nature, especially those in Hawaii.
6. To prepare the student to enter advanced ecology courses and/or related fields, such as environmental health and oceanography.

OBJECTIVES FOR STUDENTS: At the completion of the lecture course, the student will be able to do the following.

Use the terminology of ecology to discuss specific principles and concepts.

2. Give examples and explain the interaction between organisms and environment using descriptive, functional, and evolutionary approaches.
3. Explain the factors affecting the distribution and abundance of plants and animals in Hawaii.
4. Analyze applications of principles and concepts of ecology that alleviate environmental problems and pose alternative solutions.
5. List facilities, organizations, and/or resources concerned with ecology, including those in Hawaii.
6. Describe how ecology is bound to related fields, such as health.

LECTURES:

1. There are approximately 15 weeks of lectures. Text assignments, lecture topics, supplemental readings, and significant dates, such as exam dates, are listed in the lecture outline. Additional assignments may be given.

2. Lectures will include four basic areas:
   a. the abiotic environment including physico-chemical factors, physical geography, and geology related to distribution, abundance, and interaction of organisms
   b. habitat ecology including freshwater, marine, and terrestrial habitats;
   c. ecosystem ecology including ecosystems, communities, and populations; and
   d. applied ecology including resources, pollution, and environmental health.

GRADE DETERMINATION:

1. Separate grades are givenfor lecture and laboratory. It is possible to receive different lecture and laboratory grades.

2. Periodic announced and unannounced quizes will be given. The functions of the quizes include preparation of the student for exams and to aid the student's grade as an alternative to exams. The total of the quizes may be used in place of a lecture exam except the final exam.

3. There will be 5 one, full-page to two pages, maximum limit, summaries of ecological articles. One summary per month will be due with summaries described on a separate inclusion. Each summary will be 10 points.

4. The final examination is a two hour comprehensive examination including topics from the first to last lecture. It is worth 200 points and includes no extra credit points.

5. There will be three lecture exams, each 110 points, with 10 points extra credit included.

6. Grades will be determined in the following manner with the scale below.

| | | |
|---|---|---|
| First lecture exam | 100 points | Scale 90% = A |
| Second lecture exam | 100 points | 80% = B |
| Third lecture exam | 100 points | 70% = C |
| 5 summaries | 50 points | 50% = D |
| Final examination | 200 points | below 50% = F |
| | 450 points | |

**POLICIES, CLASS** STANDING, **OFFICE HOURS,** AND **EXTRA HELP**:

1. **Attendence is mandatory. Unexcused absences that persist will result in grade penalties to be determined by the instructor.**

2. **Quizes and exams missed because of unexcused absences can not be made up. Excused absences must be documented, e.g., a physician's excuse, and will be considered by the instructor for a valid absence.**

3. **Incompletes and early exams are not given.**

4. **Students may obtain their grades at any time from the instructor. Those with deficient grades will be notified prior to the withdrawl deadline of April 5, 1999.**

5. **Student's may obtain their grades at anytime from the instructor.**

6. **Tutoring and extra help is available. Please consult the instructor.**

7. **Please note that late assignments are reduced by one grade level within 24 hours after the due date and after 24 hours are not accepted, resulting in F grades.** This **is biology department policy.**

8. **The instructor's office is in Henry Hall, Rm 16, phone 735-4808, fax (808) 739-4618, e-mail =RIwamoto@Chaminade.edu. Office hours are posted outside the faculty office or outside of the library.** If **you can not see me during office hours, plese see me to make an appointment.**

9. **Those students with special needs, e.g., learning disabilities, should consult with the instructor during the first or second week of classes.**

Bio. **471-Ecology** Mr. **R. Iwamoto**
**Chaminade University of Honolulu**

**ECOLOGY SUMMARIES AND LAB NOTEBOOK**

**Ecology Summaries:**

1. **The objectives of the summaries are threefold:**
   a. **To read and report on cuurent topics in ecology;**
   b. **To offer an alternative to quizes and examinations; and**
   c. **To participate in "writing across the curriculum," compositions in each area of the university curricular. This should help you develop and enhance your ability to research and write about selected** topics.

2. **There will be five, one, full-page to two page, maximum limit, summaries. Each summary will be worth 10 points and will count toward the lecture grade.**

3. **The criteria for the summaries are as follows:**
   a. **They must be from a 1998 or 1999 publication from a newspaper, magazine, or journal;**
   b. **The articles must be on scientific ecology, e.g., not on surfing waves or cellular and molecular biology.**
   c. **They must** be **word processed or typed** following university **writing standards;**
   d. **The summaries must include: author,** title **of article, date of publication, page no (s)., and journal publication underlined or italicized, e.g., Honolulu Advertiser.** If **you utilize internet/web page articles, please use the following citation:**
      **Author (if known). "Title" (main title).**
      **Last date updated or revised (if known), <URL>**
      **Date accessed;**
   e. **Please submit a xerox copy of the article or internet/ web page print out with your summary, except from National Geographic, Hawaii Fishing News, Time, and** Sports **Illustrated; and**
   f. **Biology department policy will be followed on due dates, one grade level less for submission within 24 hours of the deadline and F grades for those** 24 **hours after the due deadline.**

**Laboratorv Notebook:**

1. **The notebook may be spiral bound, a folder, or** other **notebook material.** It **is to include the following listed in a table of contents preceding the lab exercises:**
   a. **Title or topic of the lab exercise;**
   b. **Date of the exercise;** and
   c. **Page number(s), after numbering the pages in your notebook.**

LAB NOTEBOOK CONT'D...

2. The notebook must include observations, drawings, recorded physico-chemical measurements, calculations, laboratory notes given to the class, and answers to questions asked on the hand-outs.

3. Lab hand-outs may be included, but is left to the discretion of the student.

4. Please do not write answers to questions on the laboratory hand-outs, nor laboratory notes. Separate pages are required for the above or points will be deducted.

5. Lab notebooks will be due at the time of the lab exams.

6. Examples will be available during the first week of instruction only.

*CHAMINADE UNIVERSITY OF HONOLULU* *SESSION: SPRING 1999*
*Honolulu, Hawaii 96816* *On Campus*

COURSE OUTLINE-SUBJECT TO CHANGE

Bio 471 (3 Crs) Ecology Mr. R. Iwamoto
Dept. No. #Crs. Course Title Instructor

| WEEK | DATE | DAY | ASSIGNMENTS | |
|---|---|---|---|---|
| | JAN 11 | M | Introduction: Syllabus & Course Outline | |
| 1 | 13 | W | History, Scope, Approaches | Chapt. 1 pp. 1-12, Macdonald & Kyselka: Anatomy of an Island |
| | 15 | F | Habitats and Biomes | Chapt. 3 Soil, pp. 59-65 |
| | JAN 17 | M | FATHER CHAMINADE/MARTIN LUTHER KING JR HOLIDAY NO CLASSES | |
| | 19 | T | **LAST DAY TO ADD/DROP CLASSES** | |
| | 20 | W | Habitats | Chapt. 18 Lakes &Ponds : pp. 561 - 562, pp. 564-565; Streams, pp. 569-570; Chapt. 18 Oceans pp. 574-588 |
| | 22 | F | Habitats & Hawaiian Natural History | Handouts |
| | JAN 25 | M | Hawaiian Natural History | QUIZ |
| 3 | 27 | W | Solar Radiation & Energy | Chapt. 2 pp. 14-39, **SUMMARY** 1 DUE |
| | 29 | F | Climatology | Chapt. 3 pp. 41, Chapt. 11 pp 310 - 311, Chapt. 12 pp. 348-352, Chapt. 21 pp. 689-692 |

| | | | | | |
|---|---|---|---|---|---|
| | FEB | 1 | M | Climatology: the Greenhouse Effect | Chapt. 12 pp. 355-358 |
| 4 | | 3 | W | Climatology | Reference Chapt. 3 & 10, Blumenstock & Price in Kay (ed) |
| | | 5 | F | Hydrology: Hawaii's Water Supply | |
| | FEB | 8 | M | Limiting Factors | SUMMARY 2 DUE |
| 5 | | 10 | W | Limiting Factors | Chapt. 3 pp. 40-80, QUIZ |
| | | 12 | F | Population Ecology: Growth & | Chapt. 4 pp. 81-117 |
| | FEB | 15 | M | PRESIDENT'S DAY, NO CLASSES | |
| 6 | | 17 | W | FIRST LECTURE EXAM INCLUDING LIMITING FACTORS | |
| | | 19 | F | Population Ecology: Growth & Density | |
| | FEB | 22 | M | Population Ecology: Organization | Chapt. 5 pp. 118-166 |
| 7 | | 24 | W | Population Ecology: Regulation & Evolution | |
| | | 26 | F | Population Ecology: Predation | Chapt. 6 pp. 167-204 |
| | MAR | 1 | M | Population Ecology: Symbiosis | Chapt. 7 pp. 205-262, Chapt. 9 pp. 250-262, QUIZ |
| 8 | | 3 | W | Population Ecology: Competition | Chapt. 8 pp. 229-249 **SUMMARY** 3 DUE |
| | | 5 | F | Population Ecology: Competition | |
| | | 8 | M | SECOND LECTURE EXAM | |
| 9 | | 10 | W | Community Structure & Diversity | Chapt. 10 pp. 263-306 |
| | | 12 | F | Ecosystem: Components | Chapt. 11 pp. 307-342 |

| | | | | | |
|---|---|---|---|---|---|
| | MAR | 15 | M | Ecosystem: Structure | |
| 10 | | 17 | W | Ecosystem: Trophic Structue | **SUMMARY** 4 DUE |
| | | 19 | F | Ecosystem: Production & Control | Chapt. 12 pp. 343-372, QUIZ |
| 11 | MAR 22-26 SPRING RECESS | | | | |
| | MAR | 29 | M | Ecosystem: Biogeochemical Cycles | Chapt. 13 pp.373-405 |
| 12 | | 31 | W | Ecosystem: Biogeochemical Cycles | |
| | APR | 2 | F | GOOD FRIDAY, NO CLASSES | |
| | APR | 5 | M | Ecosystem: Ecological Succession LAST DAY TO WITHDRAW | Chapt. 15 pp. 426-458 |
| 13 | | 6 | T | Preregistration for fall 1999 | |
| | | 7 | W | Ecosystem: Ecological Succession QUIZ | |
| | | 9 | F | Biomes | Chapt. 16 pp.459-513 |
| | APR | 12 | M | THIRD LECTURE EXAM INCLUDING COMMUNITY & ECOSYSTEMS | |
| 14 | | 14 | W | Biomes | Chapt. 17 pp. 514-560 |
| | | 16 | F | Biomes | **SUMMARY** 5 DUE |
| | APR | 19 | M | Pollution and Conservation | Chapt. 19 pp. 602-645 |
| 15 | | 21 | W | Pollution and Conservation | Chapt. 20 pp. 646-687 |
| | | 23 | F | Pollution and Conservation | Chapt. 21 Pp. 688-706. |
| | APR | 26 | M | Pollution and Conservation | LAB EXAM WEEK |
| 16 | | 28 | W | Review | |
| | | 30 | F | Review | |

TWO HOUR COMPREHENSIVE FINAL EXAM, TUESDAY, MAY 4, 10:30-12:30

*IMPORTANT DATES:*

*JAN 19 LAST DAY TO REGISTER, ADD/DROP CLASSES*

*FEB 5 LAST DAY TO WITHDRAW FROM CLASSES*

*MAY 3-6 FINAL EXAM WEEK*