Bio. 353-Invertebrate Zoology **Fall 1999**
Bio. 353L-Invertebrate Zoology Lab **August** 30, 1999 **to**
MWF 1-11:50 lecture, F 2:00-4:50 lab **December 15,** 1999
Chaminade University of Honolulu **Instructor:R.Iwamoto**

COURSE OUTLINE AND SYLLABUS

Lecture and Laboratorv **Texts:**

Ruppert, Edward E. and Robert D. Barnes 1994. (6th **ed.)** **(lecture text)** Invertebrate **Zoology. Saunders, N.Y., N.Y.**

2. **Wallace, Robert L. and Walter K. Taylor** 1997 (5th **ed.)** **(lab text)** Invertebrate Zoology: **A Laboratory** Manual**. Prentice-Hall, Upper Saddle River, N.J.**

Lecture and Laboratorv **Goals & Objectives**:

The lecture is designed to fulfill the following goals and objectives.

1. **To introduce the student to invertebrate zoology through** a **broad survey of systematics, phylogeny, ecology, anatomy, and physiology.**

2. **To examine Hawaiian invertebrates, especially marine intertidal and** coral invertebrates in the laboratory **and** in situ.

3. **To enable the student to identify invertebrates and provide the student with information of a practical or applied nature about invertebrates and their habitat, such as products from organisms, remedies for venomous organisms, and transmission of parasites.**

4. To **allow the student to present an organized, coherent analysis of characteristics of a given invertebrate at the conclusion of the course.**

The laboratory is designed to fulfill the following goals and objectives.

To learn **how to collect, handle, and preserve invertebrates.**

2. **To learn how to identify species, their habitats, and where to collect the organisms.**

3. **To examine zoological characteristics of selected invertebrates through microscopic, preserved specimens, and dissection methods.**

Lecture and Laboratory Schedule:

1. **Lectures will be held on MWF. There may be occasions when lectures will not be held and the period devoted to audiovisual or laboratory exercises. Conversely, there also may be occasions when a portion of the lab will be used for lecture.**

Lecture and Laboratory Schedule Cont'd...

2. Laboratory will be on Friday. On certain occasions laboratory may not be held because of an evening field trip, a lecture, and/or class assignment.

3. Topics for both lecture and laboratory are listed on separate, attached pages.

4. Attendance is mandatory for both lecture and laboratory. Unexcused absences may result in lowering of grades to be determined by the instructor.

Determination of Lecture and Laboratory Grades:

1. Separate grades will be given for lecture and laboratory.

2. Lecture grades will be determined in the following manner.

Three Examinations @ 100 points	= 300 points	Scale	90%=A
Announced and Unannounced Quizes	= 100 points		80%=B
Final Comprehensive Examination	= 200 points		70%=C
	total 600 points		50%=D
		below	50%=F

3. Laboratory grades will be determined in the following manner with the same scale as in lecture.

Two Lab Exams @ 100 points	= 200 points
Announced and Unannounced Quizes	= 200 points
	total 400 points

4. Each student will be required to maintain a laboratory notebook with observations, notes, and drawings. The laboratory notebook will not be assigned a worth in points, but will be used to determine borderline grades. It will be due at the time of the 2 lab exams and must be submitted as a requirement for completion of the course. An F grade for laboratory will be assigned for those not submitting a lab notebook.

5. Please refer to the separate inclusion on laboratory notebooks for procedures and hints. The notebook requires a table of contents with dates of exercises, title of exercise, and page numbers. The notebook is to include observations, answers to questions, and drawings with structures labeled and organisms identified.

Policies. Class Standing Extra Help and Instructor's Office Hours:

1. Incompletes, make-up exams, and make up work are normally not given and is at the discretion of the instructor. Seniors are not excused from final exams and early/late exams are not given.

Policies et, al. **Cont'd...**

2. Extra cre , **work is not an option.**

3. **Students may obtain their grades at any time by consulting with the instructor. Those obtaining deficiency notices are required to make an appointment with the instructor. Those students with D or F grades will be notified prior to the withdrawal deadline of Nov. 12, 1999 by the instructor.**

4. **The instructor's office is Henry Hall Rm 16. Office hours are posted on** the door. **If you can not see me during office hours, please do not hesitate in making an appointment. The phone number for my office is 735-4808 and** e-mail=riwamoto@chaminade.edu.

5. **If you need extra help, please see the instructor immediately. Peer tutoring may be available.**

6. **Those students with diagnosed learning problems or disabilities should notify the instructor immediately by the second week of classes.**

7. **Quizes missed can not be made** up. **Quizes given when the student has an excused absence will not be counted.**

8. **Academic dishonesty including cheating, plagiarism, and other serious offenses, such as allowing another student to copy a paper, will not be tolerated. Appropriate action will be** taken.

Selected References: PLEASE CONSULT TEXT, See Pages 6-9.

1. Borradaile, L.A., F.A. Potts, L.E.S. Eastham and J.T. Saunders *1961.* The Invertebrata. Cambridge University Press, Cambridge, England.

2. Bullough, W.S. 1958. Practical invertebrate Anat . Macmillan Co., London, England.

3. Edmondson, W.T., H.B. Ward and G.C. Whipple (eds.) 1959. Freshwater Biolo John Wiley and Sons, N.Y., N.Y.

4. Grasse, P: (ed.) 1948-. Traits de Zoologie. Masson et Cie. Paris, France.

5. Halstead, B.W. 1978. Poisonous and Venomous Marine Animals of the World. Darwin Press, Princeton, N. J.

6. Hyman, L.H. 1940-. The Invertebrates. Six Volumes. McGraw-Hill *Book Co., N.Y.,* N.Y.

7. MacGinitie, G.E. and N. MacGinitie *1968.* Natural History of Marine Animals. McGraw-Hill Book Co., N.Y., N.Y.

8. Nicol, J.A.C. *1969.* Biolo of Marine Animals. John Wiley and Sons, N.Y., N.Y.

9. Pennak, R.V. *1978.* Freshwater Invertebrates of the United States. John Wiley and Sons, N.Y., N.Y.

10. Prosser, C.L. (ed.) 1973. Comparative Animal Physiology. W.B. Saunders Co., Philadelphia, Pa.

11. Smith, D.L. 1977. A Guide To Marine Coastal Plankton and Marine Invertebrate Larva Kendall unt Pub. Co., Dubuque, Iowa.

12. Welsh, J.H., R.I. Smith and A.S. Kanmer 1968. Laboratory Exercises in Invertebrate Physiology. Burgess Pub. Co., Minneapolis, Minn.

Addendum

13. Alexander, R. McN. 1979. The Invertebrates. Cambridge University Press, New York, N.Y.

14. Margulis, L. and K.V. Schwartz 1981. Five Kingdoms: An Illustrated Guide to the hyla of Life on Earth. W.H. Freeman Co.*, San Francisco, Ca.

15. National Research Council *1981.* Marine Invertebrates: Laboratory Animal Management. National Academy Press, Washington, D.C.

16. Pechenik, Jan A. 1985. Biology of the Invertebrates. PWS Publishers, Boston, Mass.

17. Pearse, Vicki, John Pearse, Mildred Buchsbaum and Ralph Buschbaum 1987 Living Invertebrates. Blackwell. Palo Alto, Ca.

18. Willmer, P.G. Invertebrate Relationships. Cambridge University Press, Cambridge, England

19. Kozloff, Eugene N. 1990. Invertebrates. Saunders College Publishing, New York, N.Y.

20. Meglitsch, Paul A. and Frederick R. Schram 1991. Invertebrate Zoology. Oxford University Press, New York, N.Y. (3rd ed.)

Selected Hawaiian Invertebrate References

1. Bertsch, Hans and Scott Johnson 1981. Hawaiian Nudibranchs. Oriental Pub. Co., Honolulu, Hi.

2. Carlquist, Sherwin 1970. Hawaii: A Natural Histo . Natural History Press for the American Museum of Natural History, Carden City, N.J.

3. Clark, Athline M. 1978. Dangerous Marine Organisms of Hawaii. University of Hawaii Sea Grant Program, Honolulu, Hi.

4. DeLuca, Charles J. and Diana MacIntyre DeLuca 1976. Pacific Marine Life: A Survey of Pacific Ocean Invertebrates. C.E. Tuttle Co., Rutland, Vt.

5. Devaney, Dennis M. and Lucius G. Eldredge (eds.) 1977. Reef and Shore Fauna of Hawaii. Section It Protozoa through Ctenophora. Bernice P. Bishop Museum Special Publication 64(1), Bishop Museum Press, Honolulu, Ri.

6. Edmondson, Charles Howard 1946. Reef and Shore Fauna of Hawaii. Bernice P. Bishop Museum Special Publication 22, Bishop Museum Press, Honolulu,

7. Edmondson, Charles Howard 1974 (original-1949). Hawaii's Seashore Treasures (original-Seashore Treasures

8. Fielding, Ann 1979. Hawaiian Beefs and Tidepools. Oriental Pub. Co., Honolulu,

9. Hobson, Edmund S. and E.H. Chave 1972. Hawaiian Reef Animals. The University Press of Hawaii, Honolulu, Hi.

10. Kay, E. Alison (ed.) 1972. A Natural Histo of the Hawaiian Islands: Selected Readings. The University Press of Hawaii, Honolulu, Hi.

11. Kay, E. Alison 1979. Hawaiian Marine Shells. Reef and Shore Fauna of Hawaii. Section VT Mollusca. Bernice P. Bishop Museum Special Publication 64(4), Bishop Museum Press, Honlulu, Hi.

12. Summers, Catherine C. 1964. Hawaiian Fishponds. Bernice P. Bishop Museum Special Publication 52, Bishop Museum Press, Honolulu, Hi.

13. Tinker, Spencer Wilkie 1963. Pacific Crustacea. C.E. Tuttle Co., Rutland, Vt.

14. Tinker, Spencer Wilkie 1965 (7th ed.). Pacific Sea Shells. C.E. Tuttle Co., Rutland# Vt.

15. Titcomb, Margaret 1979. Native Use of Marine Invertebrates in Old Hawaii. The University Press of Hawaii, Honolulu, Hi.

16. Wallin, Doug 1975(7). Exotic Fishes and Corals of Hawaii and the Pacific. World Wide Distrib., Honolulu, Hi.

17. Zimmerman, E.C. (ed.) 1948-. Insects of Hawaii. 12 volumes to date. The University Press of Hawaii, Honolulu, Hi.

Bio. 203-204L-Cellular & organismic Biology Mr. R. twamoto

LABORATORY NOTEBOOK

Previous experiences have demonstrated that compilation of observations, data collection, calculations, and reporting of results is a problem for many scientists and students„ To avoid repetition of previous difficulties, i.e., lost, uninterpretable, unrecorded (he took it r didn't"), or dissolved by water or chemicals data, purchase a bound (non-spiral, non-tear out page) type of laboratory notebook. The following procedures are to be followed in your notebook.

1. All observations, data, calculations, laboratory notes, and tab related materials must be entered directly into the notebook. Neatness is not a prerequisite, but it is a necessity that notes be legible to you.

2. An index or table of contents is required and includes the following: a) date of exercise, b) topic, and c) page numbers in the lab book.

3. Number the pages in your notebook if unnumbered. Uneven numbered pages are used for. field data, or original observations, rough calculations, and unorganized materials. Even numbered pages are used for organized summaries, answers to questions, and conclusions.

4. Drawings are mandatory with identification of structures and organism. Specific characteristics differentiating the specimen from others should be noted for later use, i.e., studying for identification questions on exams.

5. Since recopying of notes is discouraged, notebooks should be presentable with information completed to the current lab period. Notebooks will be examined without previous notice to determine progress.

6. Grading of notebooks is based on 1) organization-inclusion of all assigned works, tabla of contents, labeling and identification of structures and specimens in drawings, and completeness of data collected and 2) interpretations observations in exercises, completeness/correct answers to questions asked, conclusions drawn, and error analysis.

Hints:

1. Record everything and anything in the beginning. With time and experience you will learn what, how, and why to record information with your own shorthand that will allow greater freedom in recording and interpreting.

2. Immediately after obtaining data. and completing observations, review and organize them. Remember that time is the ally of forgetfulness.

3. Use writing material that is waterproof and streak proof.

4. Do not depend on "the other person" to take your notes, especially when working in group type experiments and exercises or field trips.

5. Lab hand-outs, review articles, supplemental information, and completed lab reports can be &fixed to your notebook. References used should definitely be included with name(s) of author(s), title, year, and volume/page numbers.

6. When the instructor presents information, especially at the beginning of the lab period, write copious notes. Often lab exam questions and signific information for successful completion of lab exercises are contained in the beginning briefing.

CHAMINADE UNIVERSITY *WRITING* STANDARDS

All work submitted by Chaminade University students must meet the following Writing Standards. Written assignments which fail to meet these standards will not be accepted by Chaminade University faculty unless alternative criteria nave been specified by an instructor for a particular assignment.

(1) A paper must have a title page on which the writer gives the title, his or her name, the course title, and the date of submission. For short papers, it is usually adequate to provide -this information on the first page of the paper.

A paper must adhere to accepted manuscript format.*

a) It must be typed on white 8}" by Jig paper (except for in-class essays).

b) It must be double-spaced and typed *on only* one side of the paper.

e) It must have adequate margins en. *top,* bottom, *and* sides.

d) References and/or footnotes must be used in accordance with standards specified by the instructor. In the absence of such specification, the writer should use standards given in English 102.

(3) A paper must adhere to conventional standards for written expression.

a) It should be free of errors in spelling, punctuation, capitalization and grammar.

b) The vocabulary and syntax should be appropriate to the assignment.

c) The writer should use proper sentence construction and coherent paragraphing.

*See the handbook of English recommended by the English Department for a complete list of manuscript requirements.

WRITING ASSISTANCE

The Chaminade Learning Center provides assistance for students in proofreading and correcting their written assignments. A writing clinic and tutorials are available to students at no cost to assist them in the mastery of basic writing skills. Typing instruction is available at several locations near Chaminade University and there are also lists of student typists available in the Learning Center.

CHAMINADE UNIVERSITY OF HONOLULU
Honolulu, Hawaii 96816

SESSION: FALL 1999
On Campus

COURSE OUTLINE-SUBJECT TO CHANGE

BIO 353 (*3* Crs) Invertebrate Zoology Mr. R Iwamoto
Dept. No. #Crs. Title Instructor

WEEK	DATE			ASSIGNMENTS	
	AUG	*30*	M	Introduction: Syllabus & Course Outline	Chapt. 1 pp. 1-9
1	SEPT	1	W	Habitats: Terestrial, Marine, Estuarine, & Freshwater	Chapt. 2 pp. 10-67
		3	F	Spiritual Convocation at Mystical Rose Chapel no classes at 11-11:50	
	SEPT	6	M	LABOR DAY HOLIDAY, NO CLASSES	
		7	T	LAST DAY TO ADD/DROP CLASSES	
2		8	W	Protista: Sarcomastigophora	Chapt. 2
		10	F	Protista: Sarcomastigophora	Quiz on Habitats
	SEPT	*13*	M	Protista: Ciliophora	
3		15	W	Protista: Sporozoa	Chapt. 5 pp. 174-202
		17	F	Video-Nova:"Conquest of Parasites"	Chapt. 3 pp. 68-94
	SEPT	20	M	Metazoan Evolution & Bilateral Symmetry	Handouts
4		22	W	Porifera	Chapt. 4 pp. 95-173
		25	F	Porifera	
	SEPT	27	M	Cnidaria: Hydrozda	Chapt. 4
5		29	W	Cnidaria: Scyphozoa	
	OCT	1	F	Cnidaria: Anthozoa	Quiz on Cnidaria

	OCT	4	M	FIRST LECTURE EXAM EXCLUDING CNIDARIA	
6		6	W	Coral Reefs	Chapt. 4 pp. 157-173
		8	F	Platyhelminthes: Turbellaria	Chapt. 6 pp. 203-261
	OCT	11	M	DISCOVERER'S DAY HOLIDAY, NO CLASSES	
7		13	W	Platyhelminthes: Trematoda & Cestoda	Chapt. 7 pp. 262-276
		15	F	Platyhelminthes: Cestoda cont'd... Aschelminthes: Nemerteans	Chapt. 8 pp. 277-335
	OCT	18	M	Aschelminthes: Nematodes, Rotifers, and other phyla	Quiz on Platyhelminthes
8		20	W	Mollusca: Monoplacophora, Aplocophora & Polyplacophora	Chapt. 10 pp. 361-497
		22	F	Mollusca: Gastropoda	Chapt. 10
	OCT	25	M	Mollusca: Bivalvia	Chapt. 11 pp. 499-595
9		27	W	Mollusca: Cephalopoda	Chapt. 11
		29	F	Video-"Nautilus-500 Million Years Under the Sea"	
	NOV	1	M	Annelida: Polychaeta & Oligochaeta	Quiz on Mollusca
10		3	W	SECOND LECTURE EXAM EXCLUDING MOLLUSCA	
		5	F	Annelida: Hirudinea	Chapt. 12 pp. 596-616
	NOV	8	M	Arthropoda: Introduction	Chapt. 13 pp. 617-677
11		10	W	Assigned work, at National Minority Research Symposium, Phoenix, Arizona with 12 students	
		12	F	Assigned work due to conference	
				LAST DAY TO WITHDRAW WITHOUT GRADE PENALTY	

	NOV	*15*	*M*	Arthropoda: Chelicerates	
12		17	W	Arthropoda: Crustacea	Quiz on Annelids
		19	F	Arthropoda: Myriapods & Insecta	Chapt. 14 pp. 678-799
	NOV	22	M	THIRD LECTURE EXAM EXCLUDING ARTHROPODA	
13		24	W	Arthropoda: Insecta	Chapt. 15 pp, 880-824
		25-26	TH & F	**THANKSGIVING** RECESS, NO CLASSES	
	NOV	29	M	Echinodermata: Stelleroidea	Chapt. 16 pp. 825-862
14	DEC	1	W	Echinodermata: Ophiuroidea	Quiz on Arthropoda
		3	F	Echinodermata: Echinoidea & Holothuroidea	
	DEC	6	M	Lesser Worm Phyla	Chapt. 9 pp. 336-360
15		8	W	Protochordates	Chapt. 17 pp. 863-919
		10	F	Lophophorates & Evolution	Chapt. 19 pp. 996-1041 Chapt. 20 pp. 1042-1056

16 **DECEMBER** 15, 1998, **WEDNESDAY,10:30** AM-12:30 PM, TWO-HOUR CUMULATIVE FINAL EXAMINATION

IMPORTANT DATES: *SEPT 7 LAST DAY TO REGISTER, ADD/DROP CLASSES*

NOV 12 LAST DAY TO WITHDRAW FROM CLASSES

DEC 13 BEGIN FINAL EXAM WEEK

CHAMINADE UNIVERSITY OF HONOLULU
Honolulu, Hawaii 96816

SESSION: FALL 1999
On Campus

COURSE OUTLINE-SUBJECT TO CHANGE

BIO 353L (1 Cr) — Invertebrate Zoology — Mr. R Iwamoto
Dept. No. #Crs. — Title — Instructor

WEEK	DATE		ASSIGNMENTS
1	SEPT	3 F	PROTOZOA: Hay Infusion Culture, Pond Water Specimens & Sarcomastigophora Exercise 1A pp. 1-20 ALL LABS WILL INCLUDE SLIDES AND SPECIMENS UNLESS OTHERWISE INDICATED. ASSIGNMENTS ARE FROM THE LABORATORY MANUAL BY WALLACE AND TAYLOR
	SEPT	6 M	LABOR DAY HOLIDAY, NO CLASSES
		7 T	LAST DAY TO ADD/DROP CLASSES
2		10 F	PROTOZOA: Apicomplexa, Myxozoa & Ciliophora Exercise 18, C, & D, FRI 20-33
	SEPT	17 F	HABITAT AND COLLECTING FIELD TRIP: Coral Reef,
3			Tidepool, and Estuary Collect sponges for making spicule slides Handouts on Collecting
	SEPT	24 F	QUIZ ON PROTOZOA PORIFERA: Sponges, Complete Spicule Slides Exercise 2 pp. 34-45, Handouts from Devaney
4			(ed.) CNIDARIA: Hydrozoa & Scyphozoa Exercise 3A, pp. 46-65
	OCT	1 F	CNIDARIA: Anthozoa & Coral Specimens Exercise 3B, C, pp. 65-75
5			CTENOPHORA: Tentaculata & Nuda Exercise 4 pp. 77-79
	OCT	8 F	QUIZ ON PORIFERA AND CNIDARIA
6			PLATYHELMINTHES: All Classes Exercise 5 pp. 80-99

	OCT	*11*	*M*	DISCOVERER'S DAY HOLIDAY, NO CLASSES
7		15	F	ASCHELMINTHES AND NEMATODA: Nemertea through Nematomorpha Exercises 6-11 pp. 101-132 WAIKIKI AQUARIUM INVERTEBRATE FIELD TRIP: Handouts
8	OCT	22	F	FIRST LAB EXAM EXCLUDING ASCHELMINTHES AND LAB BOOKS DUE
9	OCT	29	F	MOLLUSCA: Polyplacophora & Gastropoda Exercise 12A, B, pp. 134-145
10	NOV	5	F	QUIZ ON ASCHELMINTHES MOLLUSCA: Bivalvia & Cephalopoda, Dissection of Unio (clam) and oliqo (squid) Exercise 12C, D, pp. 145-165
	NOV	11	Th	VETERANS DAY HOLIDAY, NO CLASSES
		12	F	LAST DAY TO WITHDRAW WITHOUT GRADE PENALTY
11		12	F	ANNELIDA: All Classes, Dissection of Lumbricus (earthworm) Exercise 13 pp. 166-
12	NOV	19	M	REVIEW ANNELIDA ARTHROPODA: Phylum Onychophora to Crustacea Exercise 14 pp. 186-190 and Exercise 15 pp. 191-222
	NOV	25-26	TH & F	THANKSGIVING RECESS, NO CLASSES
14	DEC	3	F	QUIZ ON ANNELIDA ARTHROPODA: Crustacea & Uniramia, Dissection of Callinectes (blue crab) and Romalea (grass-hopper) Exercise 15 pp. 219-222 and Exercise 15 pp. 222-228 ECHINODERMATA: All Classes, Dissection of Asterias (starfish), Exercise 22 pp. 270 -299
15	DEC	10	F	SECOND LAB EXAM AND LAB BOOKS D U E

IMPORTANT DATES: *SEPT 7 LAST DAY TO REGISTER, ADD/DROP CLASSES*

NOV 12 LAST DAY TO WITHDRAW FROM CLASSES

DEC 13 BEGIN FINAL EXAM WEEK