

AQUATIC ECOLOGY LABORATORY
Biology 486L/586L
Environmental Science 486L/586L
Animal Ecology 486L/586L
Fall 2015

Professor: Dr. John A. Downing
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Laboratory and Field Instructor: Ana (Mindy) Morales
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Office hours: By Appointment

Times: Section 1 – Tuesday 12:10 p.m. – 3:00 p.m.
Section 2 – Tuesday 3:10 p.m. – 6:00 p.m.

Location: Room 231E Bessey

Blackboard: Grades, course instructions, and supplementary material will be posted on Blackboard. The login page is as follows: <https://bb.its.iastate.edu/webapps/portal/frameset.jsp>

Course Description: Field trips and laboratory exercises to accompany Biol 486; hands-on experience with aquatic research, monitoring techniques, and concepts.

Special needs: Please address any special needs or special accommodations with the instructor at the beginning of the semester or as soon as you become aware of your needs. Those seeking accommodations based on disabilities should obtain a Student Academic Accommodation Request (SAAR) form from Disability Resources (DR). DR is located on the main floor of the Student Services Building, Room 1076. Their phone number is 515-294-6624, TDD 515-294-6335, or email Steven Moats at smoats@iastate.edu.

Course Objectives:

- Learn to quantify, model, and predict the physical aspects of aquatic environments (e.g. movement, heat, light).
- Understand the importance, measurement, dynamics, and cycling of major chemical species in aquatic environments (e.g. inorganic carbon, phosphorus, nitrogen, oxygen).
- Learn to quantify, model, and predict the biological cycling of energy in aquatic environments and the relationship of biological production to management goals.
- Recognize the factors responsible for the zonation of aquatic environments and organisms.
- Understand the major aquatic ecosystem management methods and models.
- Learn to recognize the principal tools of aquatic ecology and how they are applied, including field and laboratory methods.
- Obtain practical experience in solving complex ecological problems.

Required Text:

Downing, J.A. 2014. *Field and laboratory exercises in aquatic ecology*. Laboratory Manual, Iowa State University.

Field and Laboratory Schedule

Dates	Reading Assignment	Specific Objectives	Assignments Due	Location	Pre-lab Quiz
Week 1 Aug. 25	Chapters 1-3: Lab orientation, safety, field and chemical methods, lab reports, data analysis	Introduction Lab and field methodology and safety Lab report format	None	Lab	No
Week 2 Sept. 1	Chapter 4: Heat and stratification	Examine energy content and thermal structure of a lake. Collect samples for future analyses	Assignment: Hypotheses and two references (25 pts.)	Field (Ada Hayden)	Yes
Week 3 Sept. 8	Chapter 5: Light, transparency, turbidity, and light climate	Measure Secchi depth Examine light extinction profile Collect samples for future analyses	Assignment: Hypotheses and two references (25 pts.)	Field (Ada Hayden)	Yes
Week 4 Sept. 15	Chapter 6: The littoral zone: Structure and function: macrophytes and epifauna.	Collect and identify aquatic macrophytes. Determine species composition and biomass of macrophytes. Collect and identify epiphytic community. Bring waders, boots, or quick-dry clothing.	Lab Report 1: Heat, stratification, and light climate (50 pts.)	Field (Lake Laverne)	Yes
Week 5 Sept. 22	Ch. 7, 8: Water in motion: waves and currents; Benthic invertebrates in standing and running water; Particulate organic matter transport	Measure current profile and transport of water and particulate organic matter in a river. Collect, sort, and identify stream benthos samples. Bring waders, boots, or quick dry clothing.	Assignment: Littoral zone: macrophytes and epifauna (40 pts.)	Field (Skunk River)	Yes
Week 6 Sept. 29	Chapter 9: Oxygen, alkalinity, and inorganic carbon	Measure oxygen profile using electronic probes. Measure alkalinity by titration and calculate inorganic C fractions.	Lab Report 2: Stream flow and POM transport (50 pts.)	Lab & Field (Ada Hayden)	Yes
Week 7 Oct. 6	Ch. 10: Aquatic microbial ecology	Collect and incubate water for detection of coliform bacteria *Schedule time to count	Lab Report 3: Oxygen, alkalinity, and inorganic carbon	Lab & Field (Lake Laverne)	Yes

		bacteria in limnology laboratory*	(50 pts.)		
Week 8 Oct. 13	Weather make up day (if necessary)	TBA	No	TBA	No
Week 9 Oct. 20	Ch. 11: Primary production in the pelagic zone	Primary production, chlorophyll <i>a</i> analysis, <i>Previously collected</i> Discuss Lake Laverne coliform results	Assignment: Aquatic microbial ecology (40 pts.)	Lab	Yes
Week 10 Oct. 27	Ch 11: Phytoplankton ecology and taxonomy	Identify, measure, and count phytoplankton Determine biovolume <i>Previously collected</i>	None	Lab	No
Week 11 Nov. 3	Ch. 12: Secondary Production: Zooplankton	Identify, measure, and count zooplankton <i>Previously collected</i>	Lab Report 5: Primary production (50 pts.)	Lab	Yes
Week 12 Nov. 10	Ch. 13: Phosphorus and nitrogen: lab analyses	Analyze total phosphorus and nitrogen in previously collected water samples. <i>Previously collected.</i>	None	Lab	Yes
Week 13 Nov. 17	GLEON Buoy Data, Analysis using Lake Analyzer (R statistical software)	Introduction to public water quality data access and analysis	None	Lab	No
Week 14 Nov. 24	Thanksgiving Break				
Week 15 Dec 1	TBA	TBA	Final Synthesis Report (100 pts., Covering material throughout the semester)	Lab	No
Week 16 Dec 8	Lab Practical Examination	Covers equipment, materials, and calculations performed and used throughout semester		Lab	No

Grading:

	Points
Assignments: 4, points variable	130
Lab reports: 5 @ 50 pts. each	250
Final Report	100
Lab Practical Examination	50
Weekly Quizzes (10 @ 10 pts each)	100
Participation (13 labs @ 10 pts each)	130
Total	760

Letter Grade	Percent
A	90-100
B	80-89
C	70-79
D	60-69
F	<60

Additional Information:

- Lab reports must be clear, concise, and prepared in the format specified by the lab instructor. Detailed report format instructions and suggestions for effective writing are provided in your lab manual. This course helps fulfill the communication intensive requirement of ISU degree programs.
- Do not be late. If you're not here when the van leaves, you are out of luck.
- Come to lab dressed appropriately. We will go out in the field even if it is raining. On days when we will be handling chemicals in the lab, long pants and closed shoes are required.
- Instructors may curve grades if appropriate.
- Plus/ minus grades will be used.
- Please inform the TA of an absence prior to missing class when possible. If you miss a lab or quiz without a valid excuse, you will receive a zero. If you do not have an excused absence, you may not get data from someone else to use in your lab report.
- Lab reports must be submitted at the beginning of the lab period they are due. Each day a report is late, the grade will be reduced 25%. Reports may not be turned in later than 2 days after the due date.
- Data will be collected in groups and shared, but each individual must write and submit his/ her own unique report.
- Plagiarism or cheating of any kind will not be tolerated. If it is determined that you have submitted unoriginal work (i.e., written by students from previous semesters or other sections of this course), you will *at minimum* receive no points for the assignment in question. Further disciplinary action will proceed as per Iowa State University's academic dishonesty policies:
<http://www.public.iastate.edu/~catalog/2009-2011/geninfo/dishonesty.html>