BIOL 473W **Limnology** **Fall 2013**

3 CREDITS (2 lecture credits + 1 laboratory credit)

PREREQUISITES: BIOL 115, 116, 271; CHEM 105, 106; ENGL 111; ENGL 211 or 213

LOCATION: Lecture, IRVI 208 (MW, 9:15 – 10:15)
Lab, IRVI 207 (R, 2:00 – 5:00)

INSTRUCTOR:

Dr. Jay Jones Arctic Health Research Building, room 154
474-7972
Jay.Jones@alaska.edu

Office hours: MW, 10:30 – 12:00
And by appointment

TEACHING ASSISTANT:
TBD

TEXT: Limnology, by J. Kalff (2002) (required)

COURSE DESCRIPTION: The ecology of inland waters emphasizing lakes and rivers. Lecture provides graphically oriented view of concepts. Laboratory involves team-based original research from proposal to manuscript. This course satisfies capstone project degree requirements in the Biological Sciences

COURSE GOALS AND LEARNING OUTCOMES: Students who successfully complete BIOL 473 will be able to describe the major physical, chemical and biological features of lakes and related inland aquatic environments. Students will be familiar with principal techniques of limnological analysis. Students through the capstone experience will be able to successfully conduct research, data analysis, and produce a final report of the findings. The most successful students will be conversant in the major contemporary issues concerning lake ecology and will be able to access literature appropriate for completing their knowledge of subjects of particular interest to them.

INSTRUCTIONAL METHODS: Lectures will consist of a mixture of approaches including traditional lectures supplemented with graphs to illustrate concepts, discussions, and readings of papers from the primary literature. Laboratories are focused on conducting structured research projects that include both field and lab based data collection and observations, and that lead to the production of write-ups that are structured as scientific papers. Lastly, students will conduct a capstone project focusing on the biology, chemistry, or physical structure of aquatic ecosystems.

I strive to promote critical thinking and to teach students to teach themselves. Towards this goal I place a premium on students being engaged in the learning process and

active participants. I try to provide the basic principles and then work with students to develop the skills to integrate the concepts into a holistic understanding of Limnology.

CAPSTONE PROJECT: The intent of the capstone project is to integrate a range of knowledge and skills learned in previous courses, including scientific knowledge, quantitative literacy, and communication skills, and to apply these products of the university education to a creative activity. For a biologist, a fundamental expression of applied knowledge, creativity, and critical reasoning is to engage in scientific inquiry.

The capstone project in Biological Sciences consists of mentored research. The capstone project must be designed or chosen by the student in consultation with the instructor. The instructor must approve the project before work begins. The project must include both evaluation of data and communication of the study intent, methods, results, interpretation, and conclusion in the form of a written paper. Projects will be assessed using the expections for Capstone Projects in the Department of Biology and Wildlife.

COURSE GRADING: Grades in the course will be determined as follows:

Lecture Exams[1] (3 exams)	Points
10 October	100
7 November	100
14 December	100
Laboratory Reports (4)	
50 points each x 4 reports	200
Capstone Project	200
Total =	700

[1] Exams will tend to have short answer, problem solving, and essay-type questions rather than multiple-choice, fill-in-the-blank type questions.

Final grades will be determined from the percent of possible pointes earned with cutoffs of:

Grade	% of Total Points
A+	97-100
A	90-96
A-	88-89
B+	86-87
B	80-85
B-	78-79
C+	76-77
C	70-75
C-	68-69
D+	66-67

D	60-65
D-	58-59
F	0-57

COURSE POLICIES: If you have a conflict with an exam date, or you are ill on the day of an exam, you must inform the professor (Jones) BEFORE the exam. If you miss an exam without prior permission from the instructor, you will receive a zero. Late assignments will not be accepted without prior approval from the instructors. If you cannot attend class the day an assignment is due, you must arrange to turn in the assignment prior to its due date. Scores on late assignments will be penalized 10% per day. Attendance is not required in lecture but highly recommended. Notes from missed lectures will not be available from the instructor. Attendance is required for laboratory meetings.

ACADEMIC DISHONESTY: Examples of academic dishonesty include, but are not limited to, cheating on exams or assignments, helping others to cheat on exams or assignments, and plagiarizing (using someone else's ideas, words or graphics without giving them credit). Please read the UAF Honor Code in the UAF catalog. If you are caught cheating you will receive an F for the course and the case will be presented to the University Disciplinary and Honor Code Committee.

LEARNING DISABILITIES: If you have a learning disability of any kind, please inform the instructor in the first 2 weeks of class so I can accommodate your needs. Please do not wait until after an exam to make me aware of the issue. If you have not already done so, you should contact UAF's Center for Health and Counseling (474-7043).

BIOL 473 **Limnology – Lecture** **Fall 2013**

Week of	Topic	Chapters
9 September	Introduction to Limnology Properties of water	1, 2, 3, 4
16 September	Global hydrology Lake basin origins and morphology Water residence time and nutrient loading	5, 6, 7, 9
23 September	Light, energy and lake hydrology	10
30 September	Light, energy and lake hydrology Introduction to aquatic chemistry	11, 12, 13
7 October	Dissolved oxygen CO_2 and pH	15, 14
14 October	**Exam I (Monday)** Nutrient cycling – Nitrogen	16
21 October	Nutrient cycling – Nitrogen Redox chemistry	16, 18
28 October	Nutrient cycling – phosphorus Nutrient cycling – other elements	17, 19, 20
4 November	Phytoplankton Bacteria	21, 22
11 November	**Exam II (Monday)** Zooplankton	23
18 November	Zoobenthos Macrophytes	24, 25
25 November	Stream Ecology	8
2 December	Stream Ecology Acidification	8, 27
9 December	Reservoirs	29

Final: Wednesday, 18 December 2011, 8 – 10 a.m.

Week	Topic
12 September	**Field** – Pelagic and littoral zones community sampling
19 September	Lab – Zooplankton and benthos invertebrate identification • Capstone project discussion
26 September	Student-Instructor meetings - Capstone project planning *(Capstone project research question, project goals, and methods due)*
3 October	**Field** – Capstone project planning *(Lab Report #1 – Lake community structure due)*
10 October	Lab – Capstone project lab analyses Student-Instructor meetings to discuss Lab Report #1
17 October	Lab - Capstone project lab and data analyses *(Capstone project raw data due)*
24 October	Lab - Capstone project lab and data analyses *(Capstone project data results due)*
31 October	Lab – Lake stratification models *(Capstone project draft #1 due)*
7 November	Lab – Lake stratification models data analysis *(Student-Instructor meeting to discuss Capstone Projects)*
14 November	**Field** – Lake metabolism and zooplankton (sampling) *(Lab Report #2 - Lake model experiment due)*
21 November	Lab – Whole lake metabolism data analysis
28 November	Thanksgiving – No class *(Lab Report #3 – Whole lake metabolism due)*
5 December	Lab – Controls of primary production experiment – Initial set-up
12 December	Lab – Controls of primary production experiment continued *(Lab Report #4 – Lake algal biomass and primary production due 12/16)*

List of Lab Reports:

1. Lake invertebrate community structure
2. Physical structure of lakes (lake model experiment)
3. Algal biomass and primary production
4. Whole lake metabolism

Final Evaluation of Capstone Project by Research Supervisor

To be completed by student

Student's name _____ Date _____

Capstone Project Title _____

_____

Research Supervisor _____

To be completed by Research Supervisor

	Yes (excellent)	Somewhat (adequate)	No (inadequate)
1. Is the capstone project the product of data collection and/or analysis by the student?			
2. Does the capstone paper make a compelling argument for the significance of the student's research within the context of the current literature?			
3. Does the capstone paper clearly articulate the student's research goals?			
4. Are the methods appropriate given the student's research agenda?			
5. Is the data analysis appropriate and accurate?			
6. Does the author interpret the results skillfully and accurately?			
7. Are the tables and figures clear, effective and informative?			
8. Is there a compelling discussion of the implications of findings?			
9. Is the literature review appropriate and complete?			
10. Are the citations presented consistently and professionally throughout the text and in the list of works cited?			
11. Is the writing appropriate for the target audience?			
12. Is the paper clearly communicated and free of language errors?			