4 CREDITS

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

LOCATION: Lecture, IRVI 201 (MWF, 9:15 – 10:15)
Lab, IRVI 207 (R, 2:00 – 5:00)

INSTRUCTOR: Dr. Jay Jones
AHRB 154
474-7972
ffbjj@uaf.edu
Office hours: Thursday, 12:00 – 1:00
And by appointment

TEACHING ASSISTANT:
Hannah Clilverd
T-6 (LTER Trailer east of Arctic Health)
474-1534
Fthmc1@uaf.edu
Office hours: MW 10:30 – 11:30
And by appointment


COURSE DESCRIPTION: The ecology of inland waters emphasizing the biological,
chemical and physical characteristics of lakes and rivers. The lecture provides graphically-
oriented view of concepts. The laboratory involves team-based field and laboratory research
projects that lead to the production of scientific reports.

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. In addition, 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.
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.

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

<table>
<thead>
<tr>
<th>Lecture Exams¹ (3 exams)</th>
<th>Points</th>
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<tbody>
<tr>
<td>9 October</td>
<td>100</td>
</tr>
<tr>
<td>10 November</td>
<td>100</td>
</tr>
<tr>
<td>16 December</td>
<td>200</td>
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<table>
<thead>
<tr>
<th>Laboratory write-ups² (6 papers)</th>
<th>Points</th>
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<td>50 points each × 6 write-ups</td>
<td>300</td>
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¹ Exams will tend to have short answer, problem solving, and essay-type questions rather than multiple-choice, fill-in-the-blank type questions.

² The first writing assignment will involve feedback from the instructors on writing style, grammar and organization. Initial versions of papers will be graded and commented upon. Students will complete a revision incorporating instructor's comments.

Final grades will be determined from the percent of possible pointes earned with cutoffs of >90% (A), 80-90% (B), 70-80% (C), 60-70% (D), ≤60% (F).

**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. 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).
<table>
<thead>
<tr>
<th>Week of</th>
<th>Topic</th>
<th>Chapters</th>
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| 4 Sept  | Introduction to Limnology  
Properties of water  
Global hydrology | 1, 2, 3, 4, 5 |
| 11 Sept | Lake basin origins and morphology  
Water residence time and nutrient loading | 6, 7, 9 |
| 18 Sept | Light, energy and lake hydrology  
[No lecture on September 22 and 24] | 10, 11, 12 |
| 25 Sept | Introduction to aquatic chemistry  
CO₂ and pH | 13, 14 |
| 2 Oct   | CO₂ and pH  
Dissolved oxygen  
Redox chemistry | 15, 16 |
| 9 Oct   | **Exam I (Monday)**  
Nutrient cycling - phosphorus  
Nutrient cycling - Nitrogen | 17, 18 |
| 16 Oct  | Nutrient cycling - Nitrogen  
Nutrient cycling - other elements | 19, 20 |
| 23 Oct  | Phytoplankton  
Bacteria | 21, 22 |
| 30 Oct  | Zooplankton | 23 |
| 6 Nov   | Macrophytes  
Zoobenthos  
**Exam II (Friday)** | 24, 25 |
| 13 Nov  | Stream Ecology | 8 |
| 20 Nov (M,W) | Stream Ecology | |
| 27 Nov  | Acidification  
Pollution | 27, 28 |
| 4 Dec   | Reservoirs | 29 |

Final: Saturday, 16 December 2004, 8 – 10 a.m.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>7 September</td>
<td><strong>Field</strong> - Pelagic and littoral zones community sampling</td>
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<tr>
<td>14 September</td>
<td><strong>Field</strong> - Stream community sampling</td>
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<td>21 September</td>
<td><em>No class</em></td>
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<td>28 September</td>
<td>Lab - Invertebrate identification <em>(Write-up #1 - Invertebrate community structure)</em></td>
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<tr>
<td>5 October</td>
<td>Lab - Lake stratification models <em>(Write-up #2 - Lake model experiment)</em></td>
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<td>12 October</td>
<td>Student-instructor meetings</td>
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<td>19 October</td>
<td>Lab - Lake stratification models data analysis</td>
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<td>26 October</td>
<td>Lab - Controls of primary production experiment - Initial set-up</td>
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<td>2 November</td>
<td>Lab - Controls of primary production experiment continued <em>(Write-up #3 - Lake algal biomass and primary production)</em></td>
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<tr>
<td>9 November</td>
<td>Lab - Computer trophic models <em>(Write-up #4 - Trophic models)</em></td>
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<tr>
<td>16 November</td>
<td><strong>Field</strong> - Lake metabolism and zooplankton (sampling) <em>(Write-up #5 - Whole lake metabolism)</em></td>
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<td>23 November</td>
<td>Thanksgiving - No class</td>
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<tr>
<td>30 November</td>
<td>Lab - Whole lake metabolism data analysis</td>
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<tr>
<td>7 December</td>
<td>Open</td>
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List of Lab Write-ups:
1. Lake invertebrate community structure - Version I
2. Lake invertebrate community structure - Version II
3. Physical structure of lakes (lake model experiment)
4. Algal biomass and primary production
5. Lake trophic interactions
6. Whole lake metabolism