
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>
</tr>
</thead>
<tbody>
<tr>
<td>4 October</td>
<td>100</td>
</tr>
<tr>
<td>3 November</td>
<td>100</td>
</tr>
<tr>
<td>15 December</td>
<td>200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Laboratory write-ups² (6 papers)</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 points each × 6 write-ups</td>
<td>300</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>% of Total Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>97-100</td>
</tr>
<tr>
<td>A</td>
<td>90-96</td>
</tr>
<tr>
<td>A-</td>
<td>88-89</td>
</tr>
<tr>
<td>B+</td>
<td>86-87</td>
</tr>
<tr>
<td>B</td>
<td>80-85</td>
</tr>
<tr>
<td>B-</td>
<td>78-79</td>
</tr>
<tr>
<td>C+</td>
<td>76-77</td>
</tr>
<tr>
<td>C</td>
<td>70-75</td>
</tr>
<tr>
<td>C-</td>
<td>68-69</td>
</tr>
<tr>
<td>D+</td>
<td>66-67</td>
</tr>
<tr>
<td>D</td>
<td>60-65</td>
</tr>
<tr>
<td>D-</td>
<td>58-59</td>
</tr>
<tr>
<td>F</td>
<td>0-57</td>
</tr>
</tbody>
</table>

**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>
</tr>
</thead>
</table>
| 6 Sept (W,F) | Introduction to Limnology  
Properties of water  
Global hydrology            | 1, 2, 3, 4, 5 |
| 13 Sept    | Lake basin origins and morphology  
Water residence time and nutrient loading       | 6, 7, 9  |
| 20 Sept    | Light, energy and lake hydrology                                    | 10, 11, 12 |
| 27 Sept    | Introduction to aquatic chemistry  
CO₂ and pH                                         | 13, 14   |
| 4 Oct      | **Exam I (Monday)**  
CO₂ and pH  
Dissolved oxygen  
Redox chemistry          | 15, 16   |
| 11 Oct     | Nutrient cycling – phosphorus  
Nutrient cycling – Nitrogen                                   | 17, 18   |
| 18 Oct     | Nutrient cycling – Nitrogen  
Nutrient cycling – other elements                               | 19, 20  |
| 25 Oct     | Phytoplankton  
Bacteria                                                   | 21, 22  |
| 1 Nov      | Zooplankton  
**Exam II (Wednesday)**                               | 23       |
| 8 Nov      | Macrophytes  
Zoobenthos                                              | 24, 25  |
| 15 Nov     | Stream Ecology                                                    | 8        |
| 22 Nov (M,W) | Stream Ecology                                        |          |
| 29 Nov     | Acidification  
Pollution                                               | 27, 28  |
| 6 Dec      | Reservoirs                                                   | 29       |

Final:  Wednesday, 15 December 2008, 8 – 10 a.m.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 September</td>
<td><strong>Field</strong> - Pelagic and littoral zones community sampling</td>
</tr>
<tr>
<td>16 September</td>
<td>Lab - Zooplankton and benthos invertebrate identification</td>
</tr>
<tr>
<td></td>
<td><em>(Write-up #1 - Lake community structure)</em></td>
</tr>
<tr>
<td>23 September</td>
<td><strong>Field</strong> - Stream community sampling</td>
</tr>
<tr>
<td>30 September</td>
<td>Student-Instructor meetings</td>
</tr>
<tr>
<td>7 October</td>
<td>Lab - Stream invertebrate identification</td>
</tr>
<tr>
<td></td>
<td><em>(Write-up #2 - Stream community structure)</em></td>
</tr>
<tr>
<td>14 October</td>
<td>Lab - Lake stratification models</td>
</tr>
<tr>
<td>21 October</td>
<td>Lab - Lake stratification models data analysis</td>
</tr>
<tr>
<td></td>
<td><em>(Write-up #3 - Lake model experiment)</em></td>
</tr>
<tr>
<td>28 October</td>
<td>Lab - Controls of primary production experiment - Initial set-up</td>
</tr>
<tr>
<td>4 November</td>
<td>Lab - Controls of primary production experiment continued</td>
</tr>
<tr>
<td></td>
<td><em>(Write-up #4 - Lake algal biomass and primary production)</em></td>
</tr>
<tr>
<td>11 November</td>
<td><strong>Field</strong> - Lake metabolism and zooplankton (sampling)</td>
</tr>
<tr>
<td></td>
<td><em>(Write-up #5 - Whole lake metabolism)</em></td>
</tr>
<tr>
<td>18 November</td>
<td>Lab - Whole lake metabolism data analysis</td>
</tr>
<tr>
<td>25 November</td>
<td>Thanksgiving - No class</td>
</tr>
<tr>
<td>2 December</td>
<td>Lab - Computer trophic models</td>
</tr>
<tr>
<td></td>
<td><em>(Write-up #6 - Trophic models)</em></td>
</tr>
<tr>
<td>9 December</td>
<td>Open</td>
</tr>
</tbody>
</table>

List of Lab Write-ups:
1. Lake invertebrate community structure – The first lab will have two versions each worth 25 pts
2. Stream invertebrate community structure
3. Physical structure of lakes (lake model experiment)
4. Algal biomass and primary production
5. Whole lake metabolism
6. Lake trophic interactions