ESM 475/575: Limnology and Aquatic Ecology, Fall 2015
Monday and Wednesday, 8:15 – 10:05am, Cramer Hall 254
CRN: 14672 (475) & 14673 (575)

Instructor: Professor Angela Strecker
Email: strecker@pdx.edu
Office: Science Building I, room 321
Office hours: M 12-1; R 10-11
Mailbox: Science Research and Teaching Center, room 218
Lab TA: Dylan Esmonde (M 2-5pm, Science Building I, room 424)

Course Description & Objectives: Limnology is a large subject that covers geological, physical and chemical aspects of freshwater environments, as well as their biology and development. Obviously, in a short course we cannot attempt to examine all facets of limnology in depth. Instead we will attempt to present an overview, emphasizing fundamental interactions and processes. The objectives of this course are to provide you with a basic understanding of the physical, chemical, and biological processes in lakes, as well as an appreciation of the impact of human activities on these waterbodies.

Course Guidelines: In order to get the most out of this course, please do the assigned readings on time and try not to miss any classes, especially labs, which will be very difficult to make up.

Attendance: I expect you to attend and participate in class. If you are absent please find out what you missed by asking your fellow students, checking D2L, and/or speaking with me. You are responsible for all material presented in class.

Late assignments: To be fair to all students, late assignments will be penalized 5% per day. If you have an emergency situation, please let me know.

Grading scale:
A: "superior", high level integration and conceptual development with factual accuracy
B: "above average", accurate with significant integration and conceptual development
C: "basic quality", mostly accurate and simply factual, modest concept development

A 94 – 100	B+ 87 – 89	C+ 77 – 79	D+ 67 – 69
A- 90 – 93	B 83 – 86	C 73 – 76	D 63 – 66
	B- 80 – 82	C- 70 – 72	D- 60 – 62

Statement on Academic Honesty:
Plagiarism or academic dishonesty of any form will not be permitted in this class and will result in a failing grade for the assignment. For more information, please see Portland State University's policy on academic honesty.

Suggested Text: Introduction to Limnology by Stanley Dodson
**You should take advantage of the companion website, which has lots of online study tools.
http://highered.mcgraw-hill.com/sites/0072879351/student_view0/

I will also be drawing material from the book Limnology: Lake and River Ecosystems by Robert Wetzel. It is on 4 hour course reserve at the library.

Desire2Learn: This class will use Desire2Learn (D2L) to share information. Your grades will also be posted on D2L. To access Desire2Learn, you must have an ODIN account. You can access D2L through https://d2l.pdx.edu

Field Trip: In early October there will be a weekend field trip to Mount St Helens/Coldwater Lake. The purpose of the trip is primarily to familiarize you with the basic equipment and techniques used by limnologists. The material and data you collect will form a major part of your labs.

Email Etiquette: As much as possible, please come to office hours to ask questions. If these times do not work for you, send me a message to set up an alternative time. Email should be a last resort. If you do need to send me an email, please follow these general guidelines:

- include an informative subject line (e.g., article #1 for ESM 475)
- include a salutation (e.g., Dear, Hello)
- address using proper titles (e.g., Dr. Strecker)
- include your name, student #, and what class you are in

As this is a professional environment, do not expect to receive a reply to your message after 5pm or on weekends; normal turnaround time for email is ~48 hours. Please email my @pdx.edu account.

Course Grade Breakdown (ESM 475)

- Participation (10%) – On-time attendance and participation in class.
- Literature review (15% + 5%) – Students will write a literature review (with references from the primary literature) on a topic of their choice pertaining to the effects of environmental stressors on lake ecosystems. Topic must be approved by instructor by **Oct 7th**. The first due date for the literature review is **Nov 9th**. I will review and make comments on an electronic version of the review, which will be returned to you, giving you the opportunity to address my comments and edits for an additional 5% (due **Nov 25th**).
- Presentation (10%) – Students will give a presentation on the subject of their literature review during the week of **Nov 2nd.** Presentations will be evaluated by instructor and peers.
- Discussions (20%) – Weekly discussions on a journal article. Students must turn in a summary of the article, plus **five** questions/topics for discussion at the **beginning** of class. Marks will be assigned on participation and quality of article summary/discussion questions.
- Exams (40%): Based on lectures, readings, lab, and discussions.
    - Mid-term (15%): Exam on **Oct 26th**.
    - Final (25%): Comprehensive exam from 8:00-9:50am on **Dec 7th.**

Course Grade Breakdown (ESM 575)

- Peer Mentorship (10%) – In addition to on-time attendance and participation in class, graduate students will be expected to work as peer mentors to other students in the class. This will involve meetings during class to provide advice and guidance.

- Literature review (15% + 5%) – Students will write a literature review (with references from the primary literature) on a topic of their choice pertaining to the effects of environmental stressors on lake ecosystems. Topic must be approved by instructor by **Oct 7th**. The first due date for the literature review is **Nov 9th**. I will review and make comments on an electronic version of the review, which will be returned to you, giving you the opportunity to address my comments and edits for an additional 5% (due **Nov 25th**).
- Presentation (10%) – Students will give a presentation on the subject of their literature review during the week of **Nov 2nd.** Presentations will be evaluated by instructor and peers.
- Discussions (20%) – Weekly discussions on a journal article. Students must turn in a summary of the article, plus **five** questions/topics for discussion at the **beginning** of class. Graduate students will be facilitating discussions. Marks will be assigned on leadership, participation, and quality of article summary/discussion questions.
- Exams (40%): Based on lectures, readings, lab, and discussions.
    - Mid-term (15%): Exam on **Oct 26th**.
    - Final (25%): Comprehensive exam from 8:00-9:50am on **Dec 7th.**

Tentative Schedule

Week	Date	Lecture Topic and Assignments	Lab Topics
1	M Sept 28	Introduction to limnology, lake origins *Reading*: Ch 1, 11 (p277-87)	Introduction to Limnology Microcosm experiment (start)
	W Sept 30	Lake morphology and morphometry, properties of water, heat *Reading*: Ch 2 (p29-45), 11 (p265-71) **Peer meeting**	
2	M Oct 5	Light in water, water movement *Reading*: Ch 2 (p46-56) **Discussion:** Magnuson et al. 2000 Science	Physical Limnology: Lake models & Stratification
	W Oct 7	The hydrologic cycle, watershed-lake interactions, oxygen, carbon *Reading*: 10 (p231-9), 11 (p272-77) **Due**: literature review topic **Peer meeting**	**Due**: Lab 1 report
	Oct 9-11	Field trip to Coldwater Lake	
3	M Oct 12	Redox processes, pH *Reading*: Ch 2 (p33-7) **Discussion:** Schindler et al. 1997 Science	Chemical Limnology: Oxygen and Alkalinity Microcosm experiment (add organisms)
	W Oct 14	Nutrient cycles, toxic chemicals *Reading*: Ch 10 (p239-58) **Peer meeting**	

4	M Oct 19	Energy flow *Reading*: Ch 9 **Discussion:** Vander Zanden et al. 1999 Nature	Chemical Limnology: Phosphorus Microcosm experiment (apply treatment) **Due**: Lab 2 report (lake models)
	W Oct 21	Phytoplankton, bacteria, and rotifers *Reading*: Ch 3, 4 (p85-90) **Peer meeting**	
5	M Oct 26	**midterm**	Biological Limnology: Macroinvertebrates and Macrophytes **Due**: field notebook and method comparison, peer evaluation of Lab 2 report
	W Oct 28	Planktonic and benthic invertebrates *Reading*: Ch 4 (p90-115), 5 (p121-4)	
6	M Nov 2	Presentations	Biological Limnology: Fish Ecology Microcosm experiment (finish) **Due**: Lab 5 report
	W Nov 4	Presentations	
7	M Nov 9	Macrophytes, fish and other aquatic vertebrates *Reading*: Ch 5 (p124-38) **Due**: literature review **Peer meeting**	Experimental Limnology: Microcosms – Zooplankton **Due**: Lab 6 report
	W Nov 11	*holiday*	
8	M Nov 16	Population ecology: Life history, evolution, and population dynamics *Reading*: Ch 6 **Discussion:** Winder and Schindler 2004 Ecology	Experimental Limnology: Microcosms – Phytoplankton
	W Nov 18	Community ecology: Species interactions *Reading*: Ch 7, 8 **Peer meeting**	
9	M Nov 23	Landscape ecology: Lakes, rivers, reservoirs; lake ontogeny *Reading*: Ch 11 (p269-77) **Discussion:** Palkovacs and Post 2009 Ecology	no lab (open lab on Monday)
	W Nov 25	*no class* **Due:** literature review resubmission	
10	M Nov 30	Environmental stressors in lakes **Discussion**: Conservation Magazine	Poster presentations on microcosm experiments
	W Dec 2	Citizen limnology and environmental management *Reading*: Ch 12 **Peer meeting**	
Final	M Dec 7	**Final Exam** – 8:00 – 9:50am	**Due Dec 9**: Final paper on experiments