

## Winter Term, 2007 Biology 308

**Freshwater Biology** is intended mainly as an ecology-oriented course for undergraduate biology majors, although others with adequate prerequisites are welcome. Instructor's consent may be required if prerequisites are not met. It is a basic course on the physical and chemical factors of freshwaters, their interactions, and their influence on the productivity and species composition of diverse lake and stream types. Comparisons with ocean systems will be made when relevant. The human influence on freshwater systems (both negative and positive) will also be covered. The weekly labs will include the examination of a variety of freshwater organisms, some analytical techniques, and a few video illustrations of freshwater habitats.

**Prerequisites are: Bi 213 or 253 (or equivalent from another university or college).**

**Instructor: Richard Castenholz, 482 Onyx Bridge, 6-4530, rcasten@uoregon.edu**

**Graduate T.A.: Alex Wyndham, 480 Onyx Bridge, 521-5399, awyndham@uoregon.edu**

**Undergraduate T.A.: Eric Lindberg-Johnson, 483 Onyx Bridge, 6-4530, elindber@uoregon.edu**

MWF 1:00- 1:50 PM, **331 Klamath** (Labs: Tues in **111 Huestis**. 10:00-11:50 AM, 2:00-3:50 PM, and 4:00-5:50 PM)

### Tentative Lecture and Reading Schedule:

Grades will be based on 2 written exams (1 hour midterm & 1+ hour during final exam period: 30 & 40 points, respectively); 1 term paper worth 16 points, and 7 points for each of two lab quizzes (lab is obligatory). Occasional supplementary readings will be on reserve in the Science Library.

The 2 written exams will be based on **lectures and readings** with a review session before each.

The lectures will be supplemented by handouts that will be shown as overheads during the lectures, in addition to some Powerpoint presentations that will be available on the Bio Dept. course website.

The textbook for the 2007 term is: Textbook of Limnology, by Gerald A. Cole, 4<sup>th</sup> edition, Waveland Press. The assigned pages below are from this text. [**Chapt. 2, pp.8-29 as preliminary reading for definitions, etc.**] [**ALSO as prerequisite and help for the lab work, read Chapt. 3 (pp. 30-57) and Chapt. 4 (pp. 58-87)**]

Week 1 – Jan 8, 10, & 12: Introduction and Origin & Age of Lakes—Chapt. 1 pp.1-7; Chapt. 6 pp.112-131.

Week 2 – **Jan 15 (MLK holiday)**, 17, & 19: Origin of lakes (continued); Lake Morphometry; -- Chapt. 7 pp.132-150. Light & photosynthesis, etc – Chapt. 9 pp.178-193. Also pp. 99-104 (primary production) (and pp. 104-111: secondary production)

Week 3 – Jan 22, 24, & 26: Light effects (continued); Temperature cycles, lake stratification – Chapt. 10 pp.194-217; and pp. 218-223; Dissolved oxygen. – Chapt. 12 pp.239-262.

Week 4 – Jan 29, 31, Feb 2: Inorganic carbon & pH – Chapt. 13 pp.263-289; Rivers and the export of materials from watersheds.– Chapt. 8 pp.151-177.

Week 5 – Feb 5, 7 & 9: Salinity and major ion composition of lakes and rivers. – Chapt. 14 pp. 290-317. **First hour exam, Friday Feb. 9<sup>th</sup>.**

Week 6 – Feb 12, 14, & 16: Oxidation-reduction potential; begin nutrients (phosphorus, nitrogen, iron, silica, micro-nutrients, etc)--concentrations & cycling. Chapt. 15 pp.318- 342. (**Lab. quiz Tues. Feb. 13**)

Week 7 – Feb 19, 21, & 23: continue with nutrient chapter.

Week 8 – Feb 26, 28, & March 2: Eutrophication and restoration (case histories), sewage treatment, etc.—portions of Chapt. 15; pp.286-289, and **outside reading** (to be provided)  
Week 9 – March 5, 7, & 9: Acidification and toxic contaminants: pp. 276 and **outside reading** (to be provided) (**Term paper due Friday March 9**)  
Week 10 – March 12, 14, & 16: catch-up and review. (**Lab quiz & clean up Tues. March 13**)  
Week 11 - **Final exam. Wednesday March 21—3:15 PM**

Labs :

Each weekly lab runs for 1 hour & 50 minutes. During this time we will mainly examine freshwater organisms collected by the instructor, T.A.s, and students. Also, demonstrations of some analytical methods will be made, including quantification of phosphate, ammonium, and probably photosynthesis. Portions of some lab periods may be used for discussion or review. There will be two lab quizzes of 7 points each (**Feb. 13 and March 13**). **THERE WILL NOT BE A REQUIRED FIELD TRIP DURING WINTER TERM .** Attendance will be taken during labs.

Term Paper:

The required term paper will be a **3-5 page (single space)** critical essay analyzing a subject not covered in depth by the lectures or readings in the text. A list of possible subjects or questions will be provided. The student may choose a subject outside of the list if approved by the instructor. Sources for the essay should be taken, in part, from the primary literature (i.e. scientific journals that cover freshwater biology or limnology) and/or from reviews; all references must be included in a References Cited section at the end of the essay. Much can be found on the Internet. **Essay is due on Friday March 9.**