

# Syllabus for Biology 292

## Aquatic Biology

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**Office Hours:** MWF 10:00-11:00 AM and by appointment

**Classrooms:** Lecture - 335 PPHAC; TR 10:20 AM-11:30 AM  
Lab -300 Collier; T 12:45 PM-3:45 PM

**Course Description:** An introduction to the ecology of inland waters, including lakes, ponds, wetlands and streams. Major topics include geologic origins, typology, geographic distribution, biota, ecological succession, ecosystem function and restoration/management as applied to freshwater habitats. Emphasis is placed on the interaction between organisms and the environment. Laboratories include use of field equipment, field research techniques, and identification of aquatic organisms, including protozoa, invertebrates, fish, herpetofauna and plants. Many laboratories will be conducted out of doors, and there is one required field trip off campus. This course serves as an elective for Biology and Environmental Science majors and minors.

**Course Objectives:** Upon completion of this course students will be able to:

- 1) Demonstrate a basic understanding of the physical, chemical, and biological characteristics of lakes and streams
- 2) Understand and properly use appropriate terminology
- 3) Demonstrate the ability to interpret freshwater data
- 4) Gain a familiarity with the basic tools of freshwater research
- 5) Demonstrate a basic understanding of how to design and conduct freshwater research
- 6) Know where to find information about freshwater ecosystems
- 7) Demonstrate the ability to communicate data concerning lakes and streams
- 8) Identify major groups of aquatic organisms
- 7) Work together as an individual and in teams

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**Text:** Dodds, Walter and Matt Whiles. 2010. *Freshwater Ecology: Concepts & Environmental Applications of Limnology* (2<sup>nd</sup> edition). Academic Press. ISBN 978-0-12-374724-2; hardcover).

Additional papers as assigned

**Grading:** The grading system is as follows:

|    |   |            |    |   |                |
|----|---|------------|----|---|----------------|
| A  | = | 93.0-100.0 | D+ | = | 67.0-69.9      |
| A- | = | 90.0-92.9  | D  | = | 63.0-66.9      |
| B+ | = | 87.0-89.9  | D- | = | 60.0-62.0      |
| B  | = | 83.0-86.9  | F  | = | 59.9 and below |
| B- | = | 80.0-82.9  |    |   |                |
| C+ | = | 77.0-79.9  |    |   |                |
| C  | = | 73.0-76.9  |    |   |                |
| C- | = | 70.0-72.9  |    |   |                |

|                                    |            |
|------------------------------------|------------|
| <b>Assessments:</b> Lecture Exam I | 15%        |
| Lecture Exam II                    | 15%        |
| Final Exam (Not cumulative)        | 15%        |
| Research Review Paper              | 10%        |
| Laboratory Practical Exam          | 20%        |
| Field Investigation Assignments    | <u>25%</u> |
|                                    | 100%       |

### **Guidelines for Written Assignments:**

- 1) Written work in the A range is based on an original, logical and coherently organized set of ideas; it makes a clear and persuasive argument (even if the reader disagrees with its argument); it brings in specific, relevant examples to back up its assertions; its points, at each turn, are clearly articulated: the words carry precise meaning, they don't obscure it; its sentences use only the words their ideas require, not anymore; its paragraphs have distinct though related roles in the essay's cohesion as a whole, each holding one thoroughly asserted idea (not two competing ideas, not one idea half-asserted); if appropriate it accurately and thoughtfully uses other sources; and its sentences are without the grammatical, spelling, or typographical mistakes that exacting proof-reading would catch. (All of this takes a lot of work. If it is all very nearly accomplished, the essay usually earns an A-.)
- 2) Written work in the B range: a very good paper, the writing of which is clearly, thoughtfully, and effectively executed. What sometimes prevents an "A" is a lack of originality, thorough thinking or careful proofreading. If two of these virtues are absent and the other areas of the paper are strong, the essay will usually earn a B-.

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- 3) Written work in the C range: some conspicuous flaw usually earns an essay a C; its argument is really underdeveloped, it contains only minimal textual support, it has problems with organization and/or sentence clarity, it is in dire need of proofreading.
- 4) Written D work either contains more than one of the large problems cited in the "C" description or finds another way to convince its reader that the author has not spent nearly enough time on the thinking or writing in the essay.
- 5) Written work that earns an F misses on all criteria (originality, articulateness, persuasiveness, organization, the absence of mechanical mistakes).

#### **Course Guidelines:**

1. It has been my experience that students who do poorly in this course generally have numerous absences. I strongly suggest that you attend and participate in all lecture sessions unless you have a valid reason not to. I will not specifically maintain lecture attendance records. However, if I detect that you have excessive absences or are habitually late to class I will speak with you in private.

Laboratory sessions, because they involve hands-on experiences that cannot be mastered effectively without performing them, are especially critical if one is to become a successful scientist. I will take attendance at laboratory sessions and field trips and part of your grade for "Field Trip Assignments" will be based on your active participation in these activities.

If you arrive late, be respectful by not disrupting a class already in progress.

2. All assignments are expected to be handed in according to the due date on the syllabus or announced in class. Late work will be penalized; the instructor will assess the penalty for any late work.
3. All students are expected to follow the principles of academic honesty as set out in the policies of Moravian College. See the Student Handbook for details. Any and all written work must be done in your own words (with the exception of direct quotations which are clearly indicated as such), and written work must include proper citations indicating the sources for any ideas, concepts, facts, or other information derived from others, whether or not you have restated it in your own words. Any cases of suspected cheating or plagiarism will be referred to the Academic Affairs Office. Academic dishonesty may result in a failing grade in the course.
4. In case of any crisis or emergency, or an extended absence from class, you must inform me either personally through Learning Services or the Academic Dean's Office.

5. Learning disability accommodations: students who wish to request accommodations in this class for support of learning disabilities should contact Learning Services (x1510). Accommodations cannot be provided until authorization is received from the appropriate disability support provider on campus.
6. These guidelines are intended for the benefit of the students as far as clarification of the instructor's expectations for the course; however, in exceptional circumstances the instructors reserve the right to exercise discretion in the application of these guidelines to individual cases or to refer a particular case to the Academic Dean if necessary.

**Classroom Expectations:**

- 1) Respect for others' answers and views.
- 2) Disruptive behavior during class will result in your dismissal from the class the first time, after that, disciplinary action will be taken.
- 3) Non-alcoholic drinks and non-odiferous foods are allowed in class; food that is especially odiferous is not permitted.
- 4) Attention to course related material only.

## Aquatic Biology Lecture Schedule Spring 2013 (Tentative)

| Day & Date |      |           | Topic   | Reading*            |
|------------|------|-----------|---|---------------------|
| T          | Jan. | 15        | Why Study Continental Aquatic Systems?  | Chapter 1           |
| Th         |      | 17        | Properties of Water   | Chapter 2           |
| T          |      | 22        | Properties of Water   | Chapter 2           |
| Th         |      | 24        | Movement of Light, Heat & Chemicals<br>in Water                                       | Chapter 3           |
| T          |      | 29        | Movement of Light, Heat & Chemicals<br>in Water                                       | Chapter 3           |
| Th         |      | 31        | Hydrologic Cycle & Physiography of<br>Groundwater Habitats                            | Chapter 4           |
| T          | Feb. | 05        | Hydrology & Physiography of Wetland<br>Habitats                                       | Chapter 5           |
| Th         |      | 07        | Physiography of Flowing Water   | Chapter 6           |
| T          |      | 12        | Lakes & Reservoirs: Physiography  | Chapter 7           |
| <b>Th</b>  |      | <b>14</b> | <b>Lecture Exam I</b>   | <b>Chapters 1-7</b> |
| T          |      | 19        | Aquatic Chemistry & Factors Controlling<br>Nutrient Cycling: Redox and O <sub>2</sub> | Chapter 12          |
| Th         |      | 21        | Carbon  | Chapter 13          |
| T          |      | 26        | Nitrogen, Sulfur, Phosphorous &<br>Other Nutrients                                    | Chapter 14          |
| Th         |      | 28        | <b>Laboratory Practical Exam</b>  |                     |
| T          |      | 05        | No Class-Spring Break   |                     |

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|           |           |  |                              |
|-----------|-----------|--|------------------------------|
| Th        | 07        | No Class-Spring Break  |                              |
| T         | 12        | Nitrogen, Sulfur, Phosphorous & Other Nutrients  | Chapter 14                   |
| Th        | 14        | Nutrient Use & Remineralization  | Chapter 17                   |
| T         | 19        | Trophic State & Eutrophication   | Chapter 18                   |
| Th        | 21        | Trophic State and Eutrophication   | Chapter 18                   |
| T         | 26        | Responses to Stress: Toxic Chemicals & Other Pollutants in Aquatic Ecosystems              | Chapter 16                   |
| <b>Th</b> | <b>28</b> | <b>Lecture Exam II</b>   | <b>Chapters 12-14; 16-18</b> |
| T         | Apr. 02   | Evolution of Organisms & Biodiversity of Freshwaters                                       | Chapter 11                   |
| Th        | 04        | Behavior & Interactions among Microorganisms   | Chapter 19                   |
| T         | 09        | Predation and Food Webs  | Chapter 20                   |
| Th        | 11        | Nonpredatory Interspecific Interactions among Plants and Animals in Freshwater Communities | Chapter 21                   |
| T         | 16        | Complex Community Interactions   | Chapter 22                   |
| Th        | 18        | Fish Ecology & Fisheries   | Chapter 23                   |
| T         | 23        | Freshwater Ecosystems  | Chapter 24                   |
| Th        | 25        | Conclusions  | Chapter 25                   |

**Final Exam: Monday, April 29 @ 9:30 AM**

\*Dodds & Whiles

## **Laboratory & Field Schedule Spring 2013 (Tentative)**

| <u>Date</u> | <u>Lab</u>  |
|-------------|---|
| T Jan. 15   | Using Dichotomous Keys; Overview of Freshwater Aquatic Animals              |
| T Jan. 22   | Aquatic Insects: Odonata, Hemiptera, Plecoptera & Ephemeroptera             |
| T Jan. 29   | Aquatic Insects: Coleoptera, Megaloptera, Tricoptera & Diptera              |
| T Feb. 05   | Freshwater Crustacea & Mollusks   |
| T Feb. 12   | Platyhelminthes, Nematoda, Nematomorpha, Gastritricha, Rotatoria & Annelida |
| T Feb. 19   | Protozoa, Porifera, Cnidaria, Bryozoa & Tardigrada                          |
| T Feb. 26   | Freshwater Algae  |
| Th Feb. 28  | Midterm Laboratory Practical Exam   |
| T Mar. 05   | No Lab: Spring Break  |
| T Mar. 12   | Field investigations  |
| T Mar. 19   | Field investigations  |
| T Mar. 26   | Field investigations  |
| T Apr. 02   | Field investigations  |
| T Apr. 09   | Field investigations  |
| T Apr. 16   | Field investigations  |
| T Apr. 23   | Field investigations  |