Spring 2-1-2017

# BIOO 434.02: Plant Physiology Laboratory

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# BIOO 434 - PLANT PHYSIOLOGY LABORATORY - SYLLABUS

## SPRING 2017

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| **Teaching Assistant:** | Tim Wheeler; email: Tim.Wheeler@umontana.edu |
| **Office Hours:** | TBA |
| **Meeting Day/Times:** | Tuesdays 2:00 - 3:50 PM |
| **Laboratory Room:** | Natural Sciences 202 |
| **Manual:** | Posted on Moodle |

### Course Description:

This course consists of a series of laboratory exercises intended to familiarize students with core concepts and techniques in plant physiology. We may also read and discuss some scientific papers in the primary literature. The lab complements the lecture course BIOO 433, which is a **necessary** pre-requisite. This is a "Partial Writing Course": grades are based on writing assignments with at least one of the assignments revised based on instructor feedback.

### Learning Outcomes:

At the end of the lab you should be able to:

1. describe the basic structure and function of main plant organs and tissues
2. use some common research techniques in plant physiology
3. explain the basics of how plants move and retain water
4. explain the basics of why plants need nutrients
5. explain the basics of photosynthesis
6. integrate and synthesize scientific information
7. write scientific reports
8. summarize scientific ideas in oral communication

### Course Structure:

The course consists of a **two hour laboratory** every week. Most of the labs are intended to help students visualize some basic concepts and common techniques in plant physiology (see Laboratory Schedule). Students will learn basic data analysis techniques and how to interpret results from simple experiments. At the end of each experimental laboratory, students are asked to either answer the questions posted in the lab manual (worksheet) or to write a short scientific report with an introduction, methods, results and interpretation. Appendix 1 of the lab manual has guidelines on how to write a short report. Although students work in pairs in the classroom and are encouraged to discuss the results in groups, *each student is required to write her/his own reports or worksheets independently*. Therefore, different wording and writing structure is expected. Failure to comply with this rule constitutes academic dishonesty and with grounds for failure of the course for all students involved.

Students will also formulate a research question in a topic of their interest and review the primary literature (scientific journals in plant physiology) that addresses that question. At the end of the semester, students will give a formal oral presentation about their research question and

whether/how available published research answers it. We will provide guidelines on how to develop a research question, search the primary literature and prepare an oral presentation.

You are encouraged to approach either the teaching assistant or the course instructor for guidance for this lab course**.**

**Grading:** Late work will lose 10% of the assigned points per day.

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| 6 Laboratory worksheets (15 each): | 90 |
| 3 Laboratory short reports (20 each): | 60 |
| Topic Literature Review/Presentation | 30 |
| **Total:** | **180** |

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|---|---|
| 90-100% | A |
| 80-89% | B |
| 70-79% | C |
| 60-69% | D |
| <60% | F |

In the past, the lab and the lecture were listed as one single, 4-credit course. However, the lecture and lab courses are now listed independently to give the opportunity to students whose major does not require the lab+lecture course, but are interested in the topic to take only the lecture. **Students taking both courses should view them as a single 4-credit course. Students may choose to receive the same grade for both courses based on a combined grade, where the lab portion (180 points) is about one-third and the lecture (450 points) the remaining two thirds of the combined grade.**

Unfortunately, due to the nature of the course, **laboratories cannot be made up**. If you have an extenuating circumstance that forces you to miss a lab, please talk to the instructors **in advance** to make some other acceptable arrangements at the discretion of the teaching assistant or course instructor. **Any student that misses three or more laboratory sessions will automatically fail the lab course. If the student is also taking the lecture, a lecture grade will be given according to the student's performance in lecture. Failure to appear in lab or to turn in homework for a lab session counts as a missed session.**

**Adds, drops and changes of grade:** This course follows university policies on drops, adds, changes of grade option, or changes to audit status. Please check the Registrar's Office Calendar for important deadlines and dates after which course changes are not automatically approved. Requests to drop a course or change the grade basis to benefit a student's grade point average will not be approved. A grade of C or higher will be considered passing for the P/NP option.

**Special circumstances:**
Only students registered with Disability Student Services will be considered for disability accommodation as needed. Please contact the teaching assistant or the main instructor at least **one week before** the accommodation is required.

**PLANT PHYSIOLOGY LABORATORY (BIOO 434) SCHEDULE 2017**

Read each lab in advance

Note assignments due date (**10% grad reduction per day late**).

| Wk | Date | Topic | Homework | Due Date |
|---|---|---|---|---|
| 1 | 24 Jan. | No Lab | | |
| 2 | 31 Jan. | LAB 1: Basics of Plant Anatomy | WORKSHEET | 7 Feb. |
| 3 | 7 Feb. | LAB 2: Data Analysis and Graphs | REPORT 1 | 14 Feb. |
| 4 | 14 Feb. | LAB 4: Mineral Nutrition: set up | none | 14 Feb. |
| | | Research Review Question | | 21 Feb. |
| 5 | 21 Feb. | LAB 3: Tissue Water Potential | WORKSHEET | 28 Feb. |
| | | Rewrite report Lab 2 based on feedback | | 28 Feb. |
| 6 | 28 Feb. | LAB 5: Xylem Water Potential | WORKSHEET | 7 Mar. |
| 7 | 7 Mar. | LAB 6: Stomatal Conductance & Transpiration | REPORT 2 | 14 Mar. |
| | | Research Review Summary | | 14 Mar. |
| 8 | 14 Mar. | LAB 4: Mineral Nutrition: Harvest | REPORT 3 | 28 Mar. |
| 9 | 21 Mar. | SPRING BREAK | | |
| 10 | 28 Mar. | LAB 7: Photosynthesis | WORKSHEET | 4 Apr. |
| 11 | 4 Apr. | LAB 8: Mycorrhizae Harvest<br>How to Make Presentations | | |
| 12 | 11 Apr. | LAB 8: Mycorrhizae Measure | WORKSHEET | 18 Apr. |
| | | Research Review Outline | | 18 Apr. |
| 13 | 18 Apr. | LAB 9: Plant Hormones | | |
| 14 | 25 Apr. | LAB 9: Hormones Cont.<br>Presentations | WORKSHEET | 2-May |
| 15 | 2-May | Presentations | | |