

# Plant Physiology and Molecular Biology Laboratory

## *BOT 3503L Course Objectives and Policies*

**Instructor:** Dr. Bernard Hauser

**Contact Information:**

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**Office hours:** Tuesday 1-2 pm or at the end of the lab.

**Objectives:**

The objective is to provide plant science students with practical experience of plant physiological and biochemical processes, and how they are influenced by environmental factors. A “hands-on” approach, along with demonstrations, is used to illustrate some of the principles and phenomena, which are covered in Physiology and Molecular Biology of Plants (BOT 3503). The mutant analysis and mineral nutrition projects will be carried out throughout the semester.

**Policies:**

Attendance and performance of the laboratory exercises are required for a passing grade. Three unexcused absences will result in a failing grade. If you miss a lab, an alternative assignment will be given and you will need to carry out the analysis based on the data your lab partners generate.

*If you are organized, the labs usually finish early, however, an extra hour sometimes is needed later in the week to complete data collection.*

It is important that the collected data be shared before departing the lab. A picture of a data sheet with your cell phone can save you time and worries in the future.

It is important to study and be familiar with each week's experiments **before** entering the laboratory. You will be expected to complete a short online quiz based on the experiments before the lab begins.

Students need to have available the following items: a calculator with arithmetic with log functions; a marker for writing on glass; a pair of safety goggles or eyeglasses with safety lens. Reminder: smoking, eating, and drinking are prohibited in the laboratory.

## **Grades:**

The course grade is determined from:

1. Lab prep: quiz or other assignment due at the start of each lab (45 points)
2. Critical thinking questions and data analysis (160 points)
3. Mineral nutrition data analysis (70 points)
4. Physiological analysis of mutants (50 points)
5. Comprehensive final examination (100 points)
6. Performance of experiments (30 points)

Total points for the course are 455. The lab instructor's evaluation of your weekly performance affects your grade (see item 6)—this is determined by attendance, performance the experiments, and tidying up at the end of each lab.

Students are expected to attend each lab. Two unexcused absences results in a grade deduction. Students generally work in groups, **but the write-ups must be an individual's own original work.**

**Turn your work in on time.** Each lab exercise has data analysis questions that need to be turned in one week after the data was collected. A penalty of 20% per day will be assessed on all assignments that are late.

## **Mutant analysis project**

Understanding phenotype from a given genotype is the goal of genetic and physiological analyses. In order to achieve this goal, we need to know the underlying network of molecular relationships that include regulatory, genetic, physical, and contextual relationships of genes and proteins. You will hypothesize, test and evaluate the function of a previously unknown locus using systems-level concepts and bioinformatic approaches. At the end of the semester a poster showing your work will be presented and evaluated.

## **Mineral Nutrition Analysis**

The mineral nutrition laboratory report will contain figures/tables and based on these data, possible mineral deficiencies will be evaluated. As the deadlines for first report approaches, you will be provided with additional information concerning the necessary format. To generate lab reports, it is essential that you have access to a computer with word processing, data analysis, and graphing software.

## **Final Exam**

The class has a cumulative final exam that is given on the last lab day. You are expected to be able to use excel to plot and analyze data, as well as know the take-home message from each lab. The best way to study for this exam is to review quiz and analysis questions from all of the labs.

Please feel free to consult with your instructor. Schedule an appointment, or send an email message. Email is checked daily. Do not allow problems to go unresolved until it is too late to correct them. In this course, emphasis is placed upon developing the ability to recognize significant facts and to reason logically. Memorization of facts is inevitable, but the best

students demonstrate they can use them, and find new information for themselves. Potential is not graded, only achievement as demonstrated in the laboratory papers and exam.