

**Bio 332: Molecular Biology and Physiology of Plants**  
Syllabus Spring 2019

lecture: TTh 9:30 -10:50  Thompson Hall - TH197  
laboratory: section 1: M 1:00 -16:50  Thompson Hall - TH317  
laboratory: section 2: M 17:00 - 20:50  Thompson Hall - TH317

**Expected Learning Outcomes**

1. To understand and apply five core concepts of biology:
   a. *Evolution:* The diversity of life evolved over time via genetic alterations and selection of resultant phenotypes (from the protein to organismal level).
   b. *Structure and function:* Structure reflects function (from molecules to organisms).
   c. *Information flow, exchange, and storage:* Organisms interact with their environment through the context-dependent expression of the genetic information that they inherit (from cells to organisms).
   d. *Pathways and transformations of energy and matter:* Biological systems grow and change by processes based upon chemical transformation pathways and are governed by thermodynamics.
   e. *Systems:* a quantitative understanding of complex biological processes at multiple functional scales.

2. To gain experience with the scientific method.

3. To gain independence in designing, executing, and analyzing a research study.

4. To develop skills in reading and understanding scientific literature, and to communicate scientific concepts and findings.

5. To develop analytical and statistical reasoning skills.

6. To place science in the context of society.

**Overview:**  
Molecular Biology and Physiology of Plants (Bio 332) explores plant growth and development, and plant responses to their environment. The lectures presents an overview of current knowledge in the field of Plant Physiology. The laboratory section is designed to teach technical skills, deepen your understanding of important physiological processes, and practice the application of the scientific method.

Most of the labs are part of a “research-based independent project”. This approach should challenge you to develop your own experimental setups, and to relate your findings to current literature. In a few cases the nature of the experimental research might require that you come to lab outside normal lab times.

One important part of the class is to strengthen your ability to write scientific reports, papers, and proposals. Original data gathered in the laboratory will be the foundation for a primary research paper that counts for a major portion of your grade. Great emphasis will be placed on furthering your ability to edit your work in response to suggestions and through your own reflection.

A second major part of the class is the analysis of original research. Textbooks can only teach a small, often superficial, portion of the field. As you transition from college to the workforce or graduate school you will need to rely on primary literature almost exclusively to stay up to date. As an upper division course, Bio 332 places emphasis on the analysis of primary research data, often in the context of the topic currently at hand in lecture.
Instructor: Andreas Madlung
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e-mail: amadlung@ups.edu
Office: TH 223F
Office hours: to accommodate everyone’s schedule my office hours can be scheduled very flexibly and are best by appointment. You are also welcome to come by and see if I am in my office and have time or to make an appointment.

The best way to reach me for questions, appointments etc. is by email!

Textbook:
- Lab manual (required, will be provided as PDF files on Canvas)
- Primary literature as needed (provided as PDFs on Canvas)

Canvas: The Canvas page will contain links to handouts, assigned papers, practice exams, and the lab manual.

Schedule:
Specific class topics in the syllabus are approximate and might change depending on our progress during class periods. Please check the website for updates.

Class policies:
Attendance is mandatory for all laboratories, and for any class that includes a student presentation, an exam, a quiz, or a paper discussion. Laboratory research, and your participation in the discussion of student contributions are part of your grade. Labs are a vital part of the class because research conducted in lab is the basis for much of your writing assignments. I understand that there might be a time when you are unable to come to lab and cannot make up the lab, either. I will allow one such absence. After that, 25 points for each unattended lab will be deducted from your total score. In the context of the independent project this means that work outside the regular lab hours can count for lab attendance in some but not all cases. Please check the lab schedule for lab activities unconnected to the independent project. Please talk to me if circumstances beyond your control (sickness or family emergencies) prevent you from coming to class or lab. Should you have to miss a class session I ask you to inform me about any absences before your absence. You are responsible for obtaining information on any schedule changes as well as on class materials you may miss during absence from class. Missed exams cannot be made up and assignments can be made up only if you missed them for medical reasons or family emergencies. To be fair to everyone and to follow departmental policies, documentation for such emergencies will be required.

Grading: (minor changes in point distributions may be made)

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework problems</td>
<td>30</td>
</tr>
<tr>
<td>3 midterm exams (each 75 points)</td>
<td>225</td>
</tr>
<tr>
<td>1 paper (proposals, 1st submission, final version)</td>
<td>125</td>
</tr>
<tr>
<td>Pre- and post-lab data sheets as applicable</td>
<td>75</td>
</tr>
<tr>
<td>Lab performance/preparedness/carefulness</td>
<td>20</td>
</tr>
<tr>
<td>Class participation</td>
<td>20</td>
</tr>
<tr>
<td>Paper discussion prep and participation (4x20 points)</td>
<td>80</td>
</tr>
<tr>
<td>Total</td>
<td>575</td>
</tr>
</tbody>
</table>

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Letter Grade Assignments:
Generally, the following table applies to assign a letter grade at Puget Sound:

<table>
<thead>
<tr>
<th>Percentage of all possible points</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>91-100</td>
<td>A</td>
</tr>
<tr>
<td>81-90</td>
<td>B</td>
</tr>
<tr>
<td>71-80</td>
<td>C</td>
</tr>
<tr>
<td>60-70</td>
<td>D</td>
</tr>
<tr>
<td>below 60</td>
<td>F</td>
</tr>
</tbody>
</table>

It may be necessary to adjust this table slightly to account for unforeseen events (eg. if an exam was harder than I thought, etc.). In that case a curve is applied. This should help you get a better grade.

What is my current grade in the class?
I often get asked this question. To help you track your progress in class I encourage you to use the following table to calculate your current grades.

Below is an example with fictitious numbers to illustrate how to calculate a current grade:

<table>
<thead>
<tr>
<th>Paper discussions (100)</th>
<th>Mid terms (300)</th>
<th>Final (150)</th>
<th>Lab work (200)</th>
<th>Total (750)</th>
</tr>
</thead>
<tbody>
<tr>
<td>add points from all quizzes</td>
<td>add points from all midterms</td>
<td>add final points</td>
<td>add points from labs, papers etc.</td>
<td>total all your points</td>
</tr>
</tbody>
</table>

Divide the total points you have by the total number of points available so far. Then multiply by 100 and you have your current percentage. For example:
Let’s assume you have a total of 400 points but two discussions, the third midterm and the final have not been added yet as well as 40 points worth of lab work. Therefore let’s assume the current total possible at the time of your calculation is 480 points.

\[ \frac{400}{480} \times 100 = 83.3\% \]. So currently you are somewhere in the B or B- range.

Exams, Quizzes, Problem sets
Exams and problem sets are designed to keep you and me aware of gaps in your basic understanding that need attention. Questions on exams and quizzes will include fill-in-the-blanks, multiple choice, short answer, and short essay. As the course progresses, test questions will become more and more “application-based”. This means that I might ask you to design an experiment, to test an experimental question, to interpret data, or to predict the outcome of an experiment that I describe. These types of questions will give you the opportunity to apply concepts you learned to new situations. This is an important skill that you – as a scientist in a practical job – will be confronted with every day. Exams are designed to take 80 minutes. There is no final exam.

Lab reports, lab notebooks
It is important to keep a neat and bound notebook for the lab. You do not need to buy an expensive lab notebook, however. Any bound notebook will work. Guidelines for the writing of lab report (research paper) will be provided in hand-outs for you. Your research paper can be prepared in groups of two (one per lab group) or by each individual, whichever you prefer. Data can be shared within the group or between groups if you properly credit the researchers who gathered the data. The research paper/lab report must be submitted electronically via Canvas. The only valid format for the attachment is Microsoft Word. Please do not use any other formats because I will make comments in the margins with MS Word “track changes” and I will need to use the “compare documents” function when I assess the progress you have made between submissions 1 + 2.
**Late assignments**
In order to be fair to all course participants, assignments that are turned in late will be subtracted 10% of your score per 24 hours that the assignment is late. Late assignments will not be accepted past one week after their due date or after the last day of class, whichever comes first.

**Participation**
Participation in class discussions is expected. I will try to encourage discussions in class that challenge you to present your opinions, your questions, and your current understanding of topics. This approach may mean that I might call on you during class or lab. This is meant to encourage you to contribute to the class. Periodically, I will ask you to prepare discussion questions about the assigned reading material. In addition to your questions, your discussion participation grade will be based on your responses to questions from other students and your constructive criticism of their discussion contributions. For paper discussions I ask you to answer assigned pre-discussion questions and turn them in as hard copy before the class discussion. Make a second copy for yourself so that you have your answers handy during the class period as well. These questions are intended to guide your reading while preparing for the discussions. During paper discussions students will be asked to take the discussion lead on certain questions that I may randomly assign.

**Hard copy assignments should only be handed in to me in person.** Some papers, slipped under my office door or my mailbox, have been lost in the past. You may place assignments in my department mailbox in the Biology office after obtaining an official time stamp from the secretary or another faculty member. If you hand in assignments this way, please send me a follow-up email so I can check that I received your work.

**Diversity statement**
We as a community of scholars at Puget Sound welcome and respect diversity in this and all classes on campus. Lack of respect for diversity will not be tolerated. Diversity encompasses age, life experiences, profession, race, religion, gender, lifestyle, social class, learning style, ethnicity, philosophy of life, sexual orientation, personality, mental and physical challenges, customs, and values, among others.
Please read the following notes provided by the University Administration

**Emergency Response**

Please review university emergency preparedness and response procedures posted at www.pugetsound.edu/emergency/ http://www.pugetsound.edu/emergency/. There is a link on the university home page. Familiarize yourself with hall exit doors and the designated gathering area for your class and laboratory buildings.

If building evacuation becomes necessary (e.g. earthquake), meet your instructor at the designated gathering area so she/he can account for your presence. Then wait for further instructions. Do not return to the building or classroom until advised by a university emergency response representative.

If confronted by an act of violence, be prepared to make quick decisions to protect your safety. Flee the area by running away from the source of danger if you can safely do so. If this is not possible, shelter in place by securing classroom or lab doors and windows, closing blinds, and turning off room lights. Stay low, away from doors and windows, and as close to the interior hallway walls as possible. Wait for further instructions.

**Quick synopsis of high priority faculty emergency response guidance:**

**Building Evacuation**

If directed to evacuate a building (by audible fire alarm or other means of communication), instruct and escort students in your class to the designated building gathering area.

**Earthquake**

In event of earthquake, instruct students to immediately take shelter under desks (when feasible). Once initial shocks have subsided, direct and escort students to the designated building gathering area.

**Act of Violence**

If you become aware or are notified about an in-process act (or potential act) of violence occurring, take immediate action appropriate to circumstances. If notified the campus or your building is in lockdown, follow instructions to shelter in place. If confronted by a violent act, make an immediate decision to flee or shelter your class in place and instruct students accordingly.

**Gathering Area/Accountability**

Each campus building has a designated emergency gathering area posted in each building and on the university website. At the building gathering area, use the Emergency Response Folder Accountability Form you will receive at the beginning of the semester to account for students in your class. Be prepared to provide the completed accountability form to emergency response staff.
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Student Contract

Please sign and return this contract to me in order to receive a grade for the course. If it is returned by the end of the second class session in the semester you can earn 1 point.

I have read and I understand the syllabus including the emergency response provisions and I am aware of the following:

- Exam dates and times. I understand that in fairness to all class participants and according to departmental policies make-up quizzes and exams are generally not given. Exceptions can only be arranged in documented cases of sickness and emergency circumstances.
- Assignment schedule: I understand that all assignments are due at the date and time stated and that points will be subtracted for late assignments.

I have read and I understand the statement on academic honesty and scientific misconduct and the University policy on academic honesty (https://www.pugetsound.edu/student-life/personal-safety/student-handbook/academic-handbook/). I understand the policies associated with violations of the guidelines stated in the student handbook. I pledge to refrain from any act of academic dishonesty or scientific misconduct, including:

- cheating on exams, quizzes, or other assignments.
- any form of plagiarism, including copying or paraphrasing any part of another student’s or researcher’s work (including textbooks and papers), and using the ideas or wording of another person without proper citation.
- fabrication or falsification of data or research results, e.g. in lab, my lab notebook, or on the lab report

I am aware that even though data might be collected collaboratively, all written assignments must be prepared by each individual independently, unless otherwise stated.

I understand that papers and assignments should only be handed in to the instructor in person. I take responsibility for lost assignments (for example those slipped under the door or into the mailbox) or those without an official time stamp by the department secretary or another faculty member or anything turned in in this way without follow-up email notification.

Name (please print)___________________________________________________

Signature:_____________________________ Date:____________________