**Next time, give students more time and feedback on the Phytobooks.**

**Biology 224**

**EXTREME PLANTS**

**Lecture: TR 8 – 9:15 am in RISC 260**

**Lab: W 1:10 – 4 pm in RISC 230**

**Spring 2023**

**Instructor: *Dr. Megan B. Rothenberger***

Pronouns: her/hers/she

Office: 220 Rockwell Integrated Sciences Center

Lab: 206 Rockwell Integrated Sciences Center

Phone: 330-5459 (office)

Email: rothenbm@lafayette.edu

Office Hours: W 11-12 am, R 9:30-11 am, or by appointment

**TA: *Olivia Sterantino***

Pronouns: her/hers/she

Email: steranto@lafayette.edu

Office Hours (in RISC 230): M 4-5 pm, R 4-5 pm, or by appointment

**Course Description and Objectives:** Plants are much more interesting and diverse than you probably ever imagined. In this course, we will be discussing the novel botanical solutions to growth and reproduction in extreme environments. You will learn not only what plants look like inside and out, but also how plant morphology and anatomy is an evolutionary response to their function and physiology. For instance, have you ever wondered why many desert plants are covered in spines, how certain species of orchids can grow on rocks or the bark of trees, or what makes some plants carnivorous?

 This course will be organized into two sections. During the first section, we will cover the general structure and organization of the plant body, and, during the second part of the course, we will explore the varied architectural alternatives that plants have evolved with respect to both form and function of growth and reproduction in each of the major terrestrial and aquatic biomes. For each biome/habitat, we will discuss the unique environmental challenges plants face and the mechanisms plants have evolved to cope with these challenges. We will also spend some time considering the cultural, medicinal, and spiritual value of plants. The course consists of lectures, discussions, laboratories, presentations, field trips, a project, ritual, and art! ***The most I can hope is that you leave this course with a deep appreciation for plants as our evolutionary elders, springs of wisdom and healing, and partners in reciprocal relationship.***

**Student Learning Outcomes:**

 SLOs are simply statements that specify what you will know or be able to do after successfully completing a course. The SLOs in this course can be sorted into 4 groups – those that relate to **KNOWLEDGE** of plant structure, function, and evolution, those that relate to **SCIENTIFIC METHOD** and **ANALYSIS** of primary literature, those that relate to the **COMMUNICATION** of plant science to diverse audiences, and those that relate to **PLANT APPRECIATION**. After successfully completing this course, you will be able to:

* recognize and describe features of plant anatomy at the cell, tissue, and organ levels,
* use microscopy tools to investigate cell and tissue features of plants and the relationship between plant structure and function,
* describe the physiological and anatomical adaptations of plants to various environments, with particular attention given to the role of evolution in shaping plant life.
* critically read, summarize, synthesize, and present information from literature in the field of plant anatomy, morphology, and functional ecology,
* possess skills to communicate what you learned in this course to diverse audiences both verbally and visually.
* Appreciate the ecological, medicinal, cultural, and spiritual values of plants.

**Course Materials:**

* **Text:** There is no required textbook for this course. However, I will scan excerpts from a variety of botanical textbooks for you to consider throughout the semester and make them available on Moodle.
* **Lab Handouts:** There is no required lab manual. However, you will be given handouts or asked to print handouts from Moodle before field or lab activities, and any handouts that I provide during class or on Moodle are required material.
* **Other supplies:** composition notebook (required), drawing pencils and colored pencils (optional)
* **Moodle:** Lecture slides, supplementary course readings, and other information relevant to the course will be posted on [Moodle](http://moodle.lafayette.edu/), which you can access using your Lafayette Network ID (username) and password.
* PRIVACY STATEMENT: Moodle contains student information that is protected by the Family Educational Right to Privacy Act (FERPA). Disclosure to unauthorized parties violates federal privacy laws. Courses using Moodle will make student information visible to other students in this class. Please remember that this information is protected by these federal privacy laws and must not be shared with anyone outside the class. Questions can be referred to the Registrar’s Office.

**Required Readings:**

The required readings are listed in a separate document available on Moodle. After we have selected journal articles from the list (i.e., one per student), you will be able to access these articles as .pdf documents on Moodle.

**Grading:**

* You can earn 700 points in this course. The final breakdown is as follows:

|  |  |  |
| --- | --- | --- |
| **EVALUATION** | **POINTS** | **PERCENTAGE** |
| Exam | 50 | ~7% |
| Project (Module for BIOL 111) | 150 | ~14% |
| Lab notebook/field journal |  |  |
| first review | 100 | ~14% |
|  second review | 100 | ~14% |
| Extreme Plants Primary Article |   |   |
| Journal article summary & critique (JASC; written) | 50 | ~7% |
| Journal article discussion (as leader) | 100 | ~14% |
| Journal article discussions (as participant) | 50 | ~7% |
| Plant Appreciation (as leader) | 50 | ~7% |
| Phytobook (this is your final) | 100 | ~14% |
| **TOTAL** | **700** | **100%** |

* **EXAM:** One exam, worth 100 points, is scheduled in week 5. This exam will include general structure and organization of the plant body. The exam will be open book and resource, and the questions will require a higher level of critical thinking. You may use your notes, textbooks, Lafayette College library resources, and even the internet to construct your responses. Collaboration on this exam is not permitted. Your responses must be crafted independently. Your TA and I will provide more information about this non-traditional exam – and how to prepare for it - in class.

* **PROJECT:** O.K., this is exciting! Students have been complaining about the way the plant units are covered in the BIOL 111 laboratory for decades! As a result, John Drummond and Jeff Norman have been exploring ways to revise the labs to make them more engaging for students. Last year, John and Jeff replaced some of the passive, observational activities with an active microscopy component that has students comparing the form and function of spores and pollen across plant species. While this activity is an improvement, John and Jeff feel there is more work to be done (e.g., improved foundational lecture, experimental component, and perhaps a field activity). Therefore, the overall goal of your group project in this class will be to revise and expand upon plant unit in BIOL 111, working closely with John Drummond and Jeff Norman as your clients. This assignment will be scaffolded to move from smaller tasks on which you will get feedback to more complex ones. As a group, you will need to compile and create all of the materials necessary to execute your educational module, including slides, readings, handouts, instructor notes, and assessments. Additional information will be available on Moodle to guide you in this project.
* **LAB NOTEBOOK:** You will need to purchase a bound composition notebook specifically for the purpose of keeping a laboratory journal – a workbook in which your observational skills are repeatedly and continuously tested and sharpened. A lab/field journal is a permanent record of observations and, if it is to fulfill its purpose, should be useful and comprehensible to other people. Please refer to the documents on Moodle for further instructions for this assignment. To help you with this assignment, I will provide examples of successful field journal entries in class and on Moodle. You must also include a table of contents at the beginning of your journal. Your field journals will be collected for a grade only twice throughout the semester (see schedule for specific dates); however, I strongly encourage you to complete each entry within 24 hours of practicum. Otherwise, you may forget the details of your experience, AND you will have an enormous amount of work to do if you wait until the last minute to write all your journal entries at once. You may also want to consider taking rough notes on a separate sheet of paper that you can transfer, more neatly, to your field journal notebook after practicum.

* **EXTREME PLANTS PRIMARY ARTICLE:** From the 8 biomes/habitats on the lecture schedule (in green) for which we are going to discuss plant adaptations and challenges, I have chosen several articles from the primary literature pertaining to that topic. I will provide a brief explanation of each biome on the first day of class, and, after considering the biomes and journal articles, you will provide me with a list of three biomes and/or articles that interest you most for this assignment. I will make every attempt to give each of you at least one of your choices. You will be assigned to a biome and ***one*** article by the second week of class. The links to all the chosen articles for each topic will be posted to the Moodle website. With the papers that you are assigned, you will need to summarize and critique the article in writing and lead the class in the discussion of your article. Although this assignment will make you a kind of “expert” on one particular biome and extreme plant adaptation, you will also be required to read and participate in discussions of the articles being presented by other students in the class. Please refer to the documents on Moodle for further instructions for these assignments.

* **PLANT APPRECIATION:** Although you will receive points for this activity, this is meant to be a fun and relaxed way to earn participation points through engagement with plants in a non-academic manner. The format is open-ended. However, please refer to the documents on Moodle for some guidelines and minimum elements to be included. I will lead us in our first plant appreciation ritual as an example. From there, you will sign up in pairs to take turns leading plant appreciation rituals and/or ceremonies that may involve exploring medicinal or cultural values of a particular plant, tasting herbal recipes created with the plant, drawing or viewing artwork of the plant, or spending time with the plant in its natural ecosystem if possible.

* **PHYTOBOOK:** We will be taking a mandatory weekend field trip to Longwood Gardens in Kennett Square, PA. There are about 11,000 taxa of cultivated plants growing at Longwood, representing more than 200 different plant families and a variety of ecosystems, including tropical rainforests and deserts. After exploring your options, you will choose and photograph a plant family that is particularly interesting to you (note: you are not allowed to remove, cut, or disturb any plants in the process!). If you are so inclined, you could also create some drawings or sketches of plants. After returning to campus, your final assignment will be to research the structural and physiological adaptations of species in this plant family and communicate this information in the form of a booklet for a general audience. My inspiration for this assignment is *Zoobooks*, an informational magazine series for children about animals. Yours will obviously focus on plants. I will give you more specific instructions for this assignment, worth a total of 100 points, later in the semester.

**Class participation & attendance:**

* 7% of your grade in this course will be based upon the quality of your class participation during article discussions.
* Class attendance is expected.
* Participation ***means regular attendance and active engagement in class discussions and activities.***
* You may miss 2 classes without being penalized – we don’t even need to discuss it *unless you want to speak to me* about whatever challenges you are facing. Additional unexcused absences may result in a loss of points from the class participation component of the grade unless there are extenuating circumstances, which I can only evaluate if you come and speak with me about it in a timely fashion. COMMUNICATION IS KEY. I am willing to work with you if you are willing to be open and honest with me.
* Even though you may miss 2 classes without being penalized, you are still responsible for turning in assignments when they are due (see schedule and the bullet on “Oops Tokens” below) *unless* you provide me with persuasive evidence demonstrating your inability to complete assignments on time. I will do my best to accommodate those with well-founded, non-habitual reasons for absences.
* There will not be make-up exam unless extenuating circumstances arise and you communicate with me in a punctual fashion. If you do not have a valid documented excuse, you will receive a mark of zero for the missed exam.
* There is a strong distinction between attendance and active engagement. To receive full credit for participation, students are required to adhere to the discussion guidelines, ask questions, raise issues, express opinions, and respond to questions. The quality of our sessions depends a great deal on the level of preparation students bring to the class. It is important that students complete the readings on time, reflect on them and be ready to engage in a discussion. Expression of students’ questions and opinions plays an important role in making class a stimulating experience for everyone.
* **“Oops Token”**: We all make mistakes or have unexpected challenges that throw us off our game. ONE time during the semester, you can email me and use your Oops Token. Think of this as a “lifeline” or “get out of jail free” card. During this ONE-time submission of your only Oops Token, you can request 1) to revise and resubmit an assignment for an improved grade (e.g., lab/field notebook, JASC) or 2) to get a one-week extension on an assignment (i.e., lab/field notebook, JASC, Phytobook) or 3) to extend the time you have to complete the exam by “time and a half” either in hours or days (e.g., you can have 4.5 hours to take the exam once you start OR an extra 2.5 days to take the exam). You cannot use the Oops token to drop or revise the exam or push back your journal article presentation and discussion, but oops Tokens hold no value – I encourage you to use it!

**Academic Support and Hints for Success:**

* **Office hours** are times when you can meet with me or Olivia to discuss the material being presented in class or other related interests. Consider visiting office hours in groups with the idea that you can learn from one another’s questions.
* Olivia will hold a review session before the exam, and you should make an effort to attend.
* Attend every class.
* Read your text and take notes BEFORE coming to class (e.g., write down the key concepts, learn vocabulary, and copy any major diagrams into your notes to bring to class).
* Use the lecture outlines and study guides provided.
* Consider forming a study group. You can even ask me to help!
* Re-write/transcribe your notes by formulating your own questions and answers.
* Realize that if I write it on the board, display it on the screen, or demonstrate it in class, it is probably important.
* Understand the diagrams in the text that are relevant to learning the material.
* Keep up with the work and reading for the course – try not to get behind.
* To promote your success with group work, your group will spend some time developing a code of conduct prior to the major group work. Thoughtful engagement with this planning will reduce the number of setbacks that can occur in group work and allow for a productive resolution of those setbacks that do occur. Further information will be posted to Moodle later in the semester.

**Special needs:**

Students with special classroom or testing needs should contact me as soon as possible so that appropriate accommodations may be arranged. ***Students must register during the first two weeks of the semester*** with the Academic Resource Hub for accessibility services and for determination of reasonable academic accommodations. If you are unsure about what constitutes special needs, go to Scott Hall (room 300) or call 610 330 3065.

**Diversity, Inclusion, and Equity Statement**

This classroom is an inclusive space for all students. One of my goals as your instructor is to make sure that the background and perspective of every student is appreciated and respected, regardless of the individual’s race, ethnicity, gender, social class, sexual orientation, religion, political affiliation, ability level, or learning style. I am committed to providing an atmosphere for learning that respects diversity and inclusion, as well as promotes equity by removing any educational barriers in our classroom. While we are working together to build a classroom community of scholars, I ask each of you to:

* Share your unique experiences, values, and beliefs
* Be open to the views of others
* Honor the uniqueness of your colleagues
* Appreciate the opportunity that we have to learn from each other
* Value each other’s opinions and communicate in a respectful manner
* Keep class discussions confidential when they involve personal reflections from your colleagues

**Classroom policies:**

* Try to relax and have fun. Let me know how I can make class more engaging and pleasurable.
* Make an effort to arrive on time and stay for the entire time. It is disrespectful to your classmates (and me) for you to *consistently* arrive late or start packing up early.
* Respect one another’s ideas and sensitivities. For collaborative environments to be successful, all individuals must feel comfortable participating.
* Cheating will not be tolerated. I will pursue the maximum penalty allowable under the Lafayette Student Handbook regarding academic dishonesty. You are responsible for reading and abiding by the College’s “Principles of Intellectual Honesty” in your student handbook. If you are unsure about something, ask me beforehand – I’ll happily explain what’s going on. If you haven’t turned an assignment in yet, you won’t be violating the policy, and you won’t get in trouble. The excuse “I didn’t know” *after the fact* won’t fly.
* Grades will be discussed during office hours or by appointment only, NOT during class or e-mail. Please be sure to meet with me regarding a particular grade within one week. ***If you would like to dispute a grade, you will need to do so in writing, and with references to reputable sources*.**
* Please keep all evaluated material until final grades are turned in and understand that you are responsible for knowing your grade at all times.
* The student work in this course is in full compliance with the federal definition of a four credit hour course. Please see the Lafayette College Compliance webpage (<http://registrar.lafayette.edu/files/2012/07/Federal-Credit-Hour-Policy-Web-Statement.doc>) for the full policy and practice statement.
* Your continued presence in the course after the second week of classes constitutes an agreement on your part to abide by the policies and guidelines set forth in this syllabus.