Botany Bio 3800
Winter 2021
Instructor: Dr. E. M. Golenberg-3123 Bio. Sci. Bldg.
Class Hours: MW 2:30-4:50 Synchronous on Zoom through Canvas links. Potential in-person class participation after Spring Break depending on COVID-19 policies.
Office Hours: Monday and Wednesday 10:00-11:00 or by appointment
Text: Raven's Biology of Plants
Web Site: Use Canvas
Email: golenberg@wayne.edu

The goal of this course is to present a solid introduction to plant morphology, evolution, development, and physiology. We will merge lecture and laboratory ("hands on") presentations together as a means of mastering the material. We will also enhance the ideas by reading and discussing recent or seminal review articles during the semester.
Course objectives:
1. Understand the essential differences between plants and animals in solving life's persistent problems.
2. Identify broad systematic differentiation among plants and their evolutionary relationships.
3. Understand basic plant morphology and development.
4. Relate concepts of physiology and development to the nature of basically prototrophic and sessile organisms.
5. Understand the role of biotechnology in plant sciences.

Tentative Lecture and Lab Activity Schedule

Date	Topic	Readings	
January 11	Introduction	Syllabus; Chapter 1	
January 13	Evolutionary Consequences of Being a Plant	Bradshaw Paper Walbot Paper	
January 18	No Class		
January 20	Continue Discussion/Tissue Culture LA	Chapter 10	
January 25	Tissue Culture LA/Early Development in Angiosperms/ Arabidopsis Transformation (Floral Dip) LA*	Chapter 22	
January 27	Early Development/Cell and Tissue of Plant	Chapter 22, 23	

	Body/LA/Petiole Explants (Hormones) LA		
February 1	Vasculature/LA Roots/LA	Chapter 23, 24	
February 3	Shoots/Stems/Leaves/LA	Chapter 25	
February 8	Shoots/Stems/Leaves/LA Secondary Growth/LA Hormones/LA (from 1/15)	Chapter 25, 26 Chapter 27	
February 10	**Exam I**		
February 15	Systematics/Species Concept/ Bryophytes	Templeton Paper/ Chapter 12 (234-243) Chapter 16	
February 17	Bryophytes/LA	Chapter 16	
February 22	Seedless Vascular Plants/LA	Chapter 17	
February 24	Seedless Vascular Plants/Gymnosperms/LA	Chapter 17 Chapter 18	
March 1	Gymnosperms/LA	Chapter 18	
March 3	Introduction to Angiosperms Discussion	Chapter 19; Double Fertilization Paper	
March 8	Introduction to Angiosperms	Chapter 19; Double Fertilization Paper	
March 10	**Exam 2**	Chapter 20	
March 15- 20	Spring Break		
March 22	Evolution of Angiosperms/LA	Chapter 20; Stebbins Paper	
March 24	Collect Arabidopsis seeds/Stratify Seeds/ DNA extraction LA	Chapter 20 Floral Formulae and Diagrams.ppt	
March 29	Evolution of Angiosperms/LA	Chapter 20	
March 31	Evolution of Angiosperms/LA	Chapter 20; Stebbins Paper	
April 5	Phylogenetic Analysis PCR Gel LA/Cloning PCR products LA/ABCE Model	Coen and Meyerowitz Paper/Honma and Goto Paper	
April 7	Plasmid Prep LA/ABCE Model	Wizard Prep Protocol/Pabon-Mora et al Paper	

April 12	RNA extraction/cDNA LA/ Evolutionary Comparisons, Experimental Design	Direct-zol Protocol /Thiessen and Melzer paper	
April 14	ABCE Model PCR/ABCE Model		
April 19	Phylogenetic Analysis Computer Lab LA/ PCR Gel and Analysis LA	Protocols will be given	
April 21	Fruit Lab LA Catch-up/ Globalization/ GMO/Ethnobotany	Chapter 20 Fruit Key Chapters 21	
April 26	**Exam 3**	Species Report Due	

Note that this schedule is tentative. We will almost certainly need to adjust our times as the semester proceeds, and we determine how much time is necessary to complete our tasks and achieve our goals. Students will be well informed of the schedule if they attend class. If we do not cover a given portion of the material before an exam, you will not be tested on that material even if it is written that way on the syllabus.
Note also that lectures and discussions will not be recorded.

Quizzes and tests: The goals of this course are only achievable if students actively participate in the course throughout the semester. This means coming to class having read the necessary materials. Quizzes will be given regularly throughout the semester on the materials that you have been assigned. Each quiz will be worth 10 points. Your grade will be based in part on 8 such quizzes. While there are no make-up quizzes, there may be a few additional quizzes. The lowest scores may be dropped.

There will be three tests given in the semester. Each test is worth 100 points. The last (third) exam will be given on the last day of class and will cover the material covered from the time of the second exam to the end of the course. There will be no cumulative final. There are no dropped exams. There are no make-up exams except for the most extraordinary circumstances. (For example, family travel does not constitute an extraordinary circumstance.)

Laboratory Notebooks*: As you can see from the tentative course schedule, laboratory exercises are integrated fully into the course structure. Therefore, you must bring a lab notebook (a bound composition book is sufficient) with you everyday of class. You do not need to write full laboratory reports, but you must write what you have done in the lab exercise (numbered or bulleted statements of steps are sufficient), what materials you have used (media, chemicals, plant material, etc.), what results you obtained (drawings of sections, observations of cultures, photographs of gels, printed trees, etc.) You must give the date for each day of lab exercises. You must keep the notebook orderly and well-attended (careful drawings, experimental notes, etc.). You may not use the lab notebook for lecture notes. You

may not make-up labs. You may not include results for exercises that you did not do. You will be graded on these aspects and on the completeness of exercises.

Remember that good drawings and experimental notes will be helpful for preparing for exams and quizzes.

The lab notebooks will be collected on each exam day for grading. Do not forget to bring you lab notebook. Late submission of a lab notebook will result in a deduction of points.
Note (and see * below under grading)**:** This semester will be different from previous semesters of this class as we are still working under COVID-19 restrictions. Frankly, I am not sure how we will be proceeding with most planned lab exercises. We will need to drop many labs. Some labs may be done in absentia (by me) and you will be shown the results. Other labs, such as microscopy work on prepared slides, may be done online using figures. In either case, you must take these exercises seriously and put the effort in to draw or report your observations completely and carefully. You will learn more and benefit by honing your observational skills and by synthesizing conclusions from what you observe. As in all classes that you take, you are the most important person in determining your success and enjoyment in your education.

Special Species Report. You will begin an individual project beginning immediately prior to Exam 2 and continuing until the end of the semester. You will be selecting two plants from among those in the greenhouse collection. You will be generating a molecular phylogeny based on their DNA. You will write a short report on each of your species in which you will identify the name of the plant, give their taxonomy from the species to family levels (including the phylogenetic tree generated in class with appropriate discussion), determine their natural areas of distribution (biogeography- including map), describe their environment with noting any specialized morphological adaptations (ecology), report on their flower structures or other reproductive structures, and describe any human usage of the plant (ethnobotany) if appropriate. The reports will be around two to four pages in length including any figures such as your molecular phylogenetic tree.

Grading
The assignment of grades will be based on a point system with letter grades being determined as

90% and higher	A range
80%-90%	B range
70%-80%	C range
60%-70%	D range
<60%	F

Range includes +'s and –'s ; No A+'s, F+'s, F-'s.

The points will be accumulated through the following

8 Quizzes	10 points each	80 points
Exam 1	100 points	100 points
Exam 2	100 points	100 points

Exam 2	100 points	100 points
Laboratory Exercises*		
3 Notebook checks	10 points each	30 points
Species Reports	25 points each	50 points
Total		460 points

*****Due to COVID-19 restrictions still in place this semester, the number of times that lab notebooks will be collected for grading probably will be less than 3. In that case, the component of the notebook checks in determining your grade will be adjusted down to the actual number of notebook checks actually done. The points therefore may be somewhere between 30 and 0 points, and the semester total somewhere between 460 and 430 points. The final grade percentages will be calculated from whatever is the final total points are.

Withdrawal Policy You may withdraw from the class without a signature and receive a tuition refund through Monday, January 25, 2021. From through February 5, you may withdraw without a signature, but you are responsible for tuition. From January 26 through March 28, you may request approval for withdrawing (initiated through Academica only) and receive a grade of WF or WP (withdrawal failing, withdrawal passing). Your grade (WP or WF) will be determined by your quiz, lab, and test grades at the time. Note that if you did not take an exam that was given up until the time of withdrawal, your score for that exam is 0. The WP grade will be given for grades of 60% and higher. The WF grade will be given for grades of less than 60%. The last day to withdraw from the class is March 28, 2021. **Withdrawal requests must be filed online.**

Students with disabilities: If you have a physical or mental impairment that may interfere with your ability to successfully complete the requirements for this course, you are invited to contact Educational Accessibility Services (313-577-1851) to discuss appropriate accommodations on a confidential basis.

CHEATING POLICY: A student found to be cheating during an exam or quiz (using a "cheat sheet", looking at another's paper, or allowing another to look at yours) will receive a zero for that test with no opportunity to drop or replace that score. A second episode of cheating will result in a grade of F for the course and may also result in initiation of university disciplinary action. Also, alteration of exams, quizzes, assignments, or lab notebooks after they have been graded will result in a grade of F. Lab notebook entries for exercises that were not done by the student due to absence will result in a grade of zero for that lab notebook grading.

ADD/DROP/INCOMPLETE POLICY: **Add** forms will not be signed after the first week of class. Please note that "**incomplete**" grades will not be issued to students in poor standing who are seeking an alternative to a late drop. See above for new withdrawal policy.

RELIGIOUS HOLIDAYS: Because of the extraordinary variety of religious affiliations of the University student body and staff, the Academic Calendar makes no provisions for religious holidays. However, it is University policy, to respect the faith and religious obligations of the individual. Students with classes or examinations that conflict with their religious observances are expected to notify within the first two weeks of the semester so that mutually agreeable alternatives may be worked out. I am aware that in some cases the exact date of a holiday or

festival cannot be given well in advance. However, you should be aware if the two- or three-day window when a festival will fall overlaps with a test date. You must notify me at the start of the course. In the case of quizzes, as you may drop a number of missed quizzes, no additional adjustments will be made.

N.B. Some material or emphases will be given in lecture that are not in your book. You will be responsible for this material in addition to the material in your book. Also, please note that I will be happy to help students understand the material that they are having trouble with during office hours. I strongly encourage you to come to office hours if you have any questions or concerns. I would like all students to succeed in this class.