PLANT FORM AND FUNCTION

**Course Description:** Anatomy of vegetative and reproductive organs of plants, unique cellular features, development and differentiation of cell and tissue types. Emphasis on physiological mechanisms. Prerequisite: BIOL 1407 or consent of instructor. Safety training given during a laboratory meeting early in the semester is required for continued participation in this course.

**Course Overview**
This course emphasizes the structure and functioning of plants. The anatomy and unique cellular features of vegetative and reproductive organs of plants are studied. Emphasis will be placed on the physiological mechanisms used by plants, including water relations, nutrient assimilation, photosynthesis, growth, signaling and adaptation to the environment. Development of cell and tissue types is considered. Methods for studying plants are considered throughout. Laboratory includes microscopic studies of major anatomical features, growth responses to environmental conditions, water relations, photosynthesis measurements, plant tissue culture and response to hormones. Genetic modification of plants will be discussed and food will be tested for GMO content.

**Prerequisites:** Biology I and II (Biol 1406/1407)
*Highly Recommended:* General Chemistry I

**LEARNING OBJECTIVES**

Upon successful completion of this course, the student will:
1. Describe plant cell structure and distinguishing features
2. Understand the role of biological macromolecules and be able to identify some important plant secondary metabolites
3. Understand and distinguish Tissue types and function in plants
4. Describe the anatomy of the plant body, including roots, stems, leaves, flowers, fruits and seeds
5. Explain transport processes and mechanisms for both water and solutes, and the relationship of these processes to photosynthesis
6. Understand plant nutritional requirements, assimilation and nutrient cycles
7. Understand and distinguish respiratory and photosynthetic energy transformations, their measurement and their regulation
8. Understand Growth, development and environmental response processes, including the signaling effects of hormones
9. Distinguish circadian rhythms, plant growth and response to external factors, including tropisms, photoperiodism, nastic movements and dormancy
10. Recognize key historical accomplishments in agriculture, and the importance of and challenges to agriculture for food, fuel and environment
11. Describe issues and applications of recombinant DNA technology and biotechnology
12. Explain Common methods used to study plant physiology
Major Course Requirements

Tentative Evaluation:
Your final grade will be based on the percentage you earn out of the total possible points. Individual extra credit is not possible, but extra points may be built into exams or other assignments. Statistical manipulations, if used (at the Instructor’s discretion), will be performed only once, at the end of the semester. A 10-point grading scale will be used:

A = 90 - 100 %
B = 80 - 89.9 %
C = 70 - 79.9 %
D = 60 - 69.9 %
F = 0 - 59.9 %

Components of Course Grade (Tentative)

Lecture: 75%
3 Exams @ 100 pts = 300
Final Exam = 100
Quizzes, Attendance = 100
[Additional Assignments @ Instructor’s Discretion = up to 100]

Laboratory: 25%
(participation, reports, quizzes, assignments, presentations) = 200

TOTAL = 800 (approx.)

The time schedule may require adjustment. Should this be the case, the assignments and weighting may change slightly. Additional assignments may or may not be provided at the Instructor’s discretion. Such assignments might include homeworks, group projects, reading assignments, quizzes, field trip or internet assignments, etc. Regardless of any such changes, the lecture and laboratory weighting of your grade shall remain at 75 % and 25 %, respectively. For example, if you make 90 % of total points available for the lecture and 80 % of total points available for the laboratory portion, then your grade would be calculated as:

(0.9 x 75) + (0.8 x 25) = (67.5) + (20) = 87.5/100 possible = B

An assignment will likely be due during the last week of class.

Every attempt will be made to follow the time and evaluation schedules shown here. It is the student’s duty to attend each class session and be aware of all assignments, deadlines, changes, etc.

NOTE: All Exams are the property of the Instructor as they must be saved for course records. Students may use the exams for study purposes during specified lab periods, but they must be returned to the Instructor at the specified time in order for the final grade to be submitted. DO NOT LEAVE THE ROOM WITH OR COPY THE EXAMS IN ANY MANNER (photocopying, photographing, scanning, etc)!

Exams will be a mixture of multiple choice, matching, fill-in the blank, short answer, labeling, calculations and essay questions. Some will require analysis and interpretation of data or experimental design to assess critical thinking skills. Some questions will be derived from laboratory activities. The Final Exam (Wednesday, May 15 from 8:00 - 10:30 AM) will contain new material from the end of the semester.
Quizzes may be given at any time in class. There will be no makeups. Homworks and other assignments may be given in class. The other assignments may include data interpretation, experimental design, calculations, opinion papers, research article summaries, internet assignments, etc. They will generally be due at the start of lecture class the following week. You are encouraged to get together and work on them as a group. However, unless specified otherwise, the assignments must be turned in individually and be written in your own words, NOT COPIED. An assignment grade of ZERO will be given if the work is not in your own words. Illegible (to the instructor) work will receive no credit.

Attendance at class is required, and will be monitored. Each student will be given a 5-absence grace allowance before losing attendance points.

Required Readings


Laboratory Topics in Botany (To Accompany 7th Ed. Raven), Evert, Eichorn & Perry (2005)
W.H. Freeman and Co., NY, NY
ISBN 0-7167-6205-6

BlackBoard: You are expected to use the course-associated site for posting notes, readings, study-guides, labs, data, etc.

Course Listserv: All students must subscribe to the class listserv, using your official University-mandated email account (firstinitiallastname@islander.tamucc.edu). You may ask questions of interest to the instructor or other students on the class listserv, eg. clarification of an assignment, as well as receive important class announcements. You are encouraged to subscribe to the Opportunities Listserv as well.

To subscribe, send an e-mail to “Botany-list-request@listserv.tamucc.edu”. Make sure that your e-mail address appears in the “From:” heading, and that the word “subscribe” is typed in the subject line. You will receive a subscription acknowledgement confirming that you have done everything correctly. To post messages to the listserv, send to “Botany-list@listserv.tamucc.edu”. Because of security concerns, you should post messages from the official TAMUCC computer account (Islander) that is used to subscribe to the listserv. At the end of class, please send an e-mail to “Botany-list-request@listserv.tamucc.edu” with “unsubscribe” in the subject heading. Please use this service to ask questions about class materials, dates, assignments, etc.

You should also subscribe to the Opportunities Listserv using the same procedure:“opportunities-list-request@listserv.tamucc.edu” This service provides notification of scholarships, research and volunteer opportunities and science-related job opportunities.

Recommended or Supplemental Reading: Supplemental readings will be posted on the Blackboard course site or placed on reserve in the TAMU-CC Library.

Text-Associated Website: The textbook has a free companion website with study-aids, animations & videos, essays, and links to additional materials: www.whfreeman.com/raven
List of Supplies

You will need a laboratory notebook, “sharpie”, calculator, laboratory coat, and safety glasses.

Other requirements may apply to field trips or laboratory.

Course Policies

ALL E-MAIL COMMUNICATIONS WITH THE INSTRUCTOR OR LAB TA MUST BE MADE THROUGH YOUR OFFICIAL UNIVERSITY E-MAIL (@ISLANDER), BY UNIVERSITY RULE.

Attendance/tardiness, Late work and Make-up Exams You are expected to attend all classes and labs in a timely manner. Important new material, as well as schedule changes and quizzes may occur at any time. It is expected that you will take notes, ask/answer questions, and participate in group activities.

LATE WORK will not be accepted, except as below, or unless otherwise specified.
Attendance is the student’s responsibility. You are responsible for the material covered in every lecture, even if it is not in the book, regardless of your attendance. Nothing missed during an unexcused absence can be made up. An excused absence allows us to make alternative arrangements to complete an assignment. Only unavoidable absences are excused. Routine events (holiday travel, non-emergency medical visits, parent-teacher conferences, household or auto repairs) should be scheduled to avoid conflicts with class. An acceptable excuse must be:
• from an appropriate source (doctor, dentist, funeral director) stating the nature of the event
• In writing, on official letterhead, and signed (it will not be returned)
• presented prior to, or within 1 week of, the absence
• It must state the dates for which the excuse applies

This policy also applies to students participating in University-sanctioned activities (such as athletics); however, in such cases, arrangements must be made at least one week ahead of time, and excuses may also be documented via a letter or memo on official university letterhead by the supervising coach or faculty member.

There are No make-up examinations: For some scheduled events, you may arrange to take a lecture exam before, but not after, its scheduled time. Quizzes cannot be made-up.

Expectations:

You are responsible for your own education. Take notes in class as some new information may be presented. Lecture notes from the instructor, when made available, do not represent everything you need to know. Read the book and handouts for further detail not covered in class, and to be prepared for laboratory. If you don’t understand, then please ask, or see the instructor after class. Don’t allow yourself to fall behind. Be diligent and thorough on written assignments and examination answers. If you are not sure of an answer, at least try. For many people, putting anything down on paper clarifies their thinking and helps with recall. Also:

• Be aware of university-imposed deadlines (ie drop dates)
• Be aware of test times and dates, including changes which may be announced in class
• Check your exams for clerical errors. The test score is not the end of the learning process. Review tests to determine why you missed an answer. Correcting your mistakes is an effective way to learn material (reflective learning).
• Work on all assigned homework problems in a timely manner. Seek tutorial help from classmates or the course/laboratory Instructors.
• Keep track of your progress in class.
The following procedures will be enforced:

* All major exams are the property of the instructor and may not be removed from class, copied, reproduced or photographed in any way
* You must be prepared to present a photo ID at all examinations
* If you leave an examination room—for any reason—you must hand in your test and you will not be allowed to resume the examination. Attend to personal matters (e.g., rest room visits) before the examination.

**Cell Phone/Electronic Device Usage Policy on Disruptive Behavior:**

As adult university students, you are expected to act with courtesy and common sense. Disruptive, disrespectful, or abusive language/behavior towards anyone in class (student, staff, faculty) will not be tolerated and could result in permanent removal from class. This includes tardiness to class, talking in class, insubordination, and electronic disturbances (cell phones, ipods, etc). **Turn it off.** Hazardous materials are used in the laboratory so “play” or reckless behavior will not be allowed. **Children are not allowed.**

**Academic Integrity/Plagiarism.**

University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in appropriate action at the discretion of the instructor, including failure of the course. **Everything should be in your own words.**

**Dropping a Class**

I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Learn the last day to drop a class with an automatic grade of “W” this term.

**Preferred methods of scholarly citations**  *(Format from J. Experimental Marine Biology and Ecology)*


**Grade Appeals* **

As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html). For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

**Disabilities Accommodations* **

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If
you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Driftwood 101.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

Suggestions for Improving Course Performance:
1. Attend all lectures and laboratories in a timely manner.
2. Take notes, ask/answer questions, and participate in group activities.
3. If you don’t understand, then please ask, or see the instructor after class.
4. Purchase and read the assigned textbook for further detail not covered in class. The textbook has **key terms** **boldfaced**, and a Summary and Chapter Review at the end of each chapter. There are also practice/think questions in the book and on the text-associated website.
5. If you perform poorly on quizzes or exams, then **change how you are preparing.**
Tentative Syllabus
(course schedule)

Wk1: Jan 23, 25  Syllabus; Overview; Molecular composition of plant cells, macromolecules (Ch 2)
Lab:  Introduction, safety, paperwork, plant (slow) seeds

Wk 2: Jan 28, 30  MLK Holiday
Feb 1  Plant secondary metabolites (Ch 2); Plant cell structure (Ch 3)
Lab:  Plant (fast) seeds, Plant propagation; Appendix F; Plant propagation video

Wk 3: Feb 4, 6, 8  Plant cell walls (Ch 3); Water movement in cells (Ch 4 pp 71-80)
The plant body and seedling structure (Ch 22; Ch 17 pp 364-377);
Lab:  Lab Topics 4.1A Plant Cells; Topic 6 Movement of substances in/out of cells

Wk 4: Feb 11, 13, 15  Development & seeds (Ch 22; Ch 17 pp 364-377)
Cells & tissues of the plant body (Ch 23)
Lab:  Lab Topics 3 & 21 Vascular plant body; seeds; cells & tissues

Wk 5: Feb 18, 20, 22  EXAM I; Respiration (Ch 6);
Lab:  Topic 7 Respiration

Wk 6: Feb 25, 27  Photosynthesis (Ch 7)
Mar 1  Lab:  Lab Topic 8 Photosynthesis I

Wk 7: Mar 4, 6, 8  Photosynthesis (Ch 7); Roots: Structure & development (Ch 24)
Lab:  Plant Sale !; Lab Topic 8 Photosynthesis II

Wk 8: Mar 11-15  SPRING BREAK

Wk 9: Mar 18, 20, 22  Roots: Structure & development (Ch 24);
Shoots & leaves: Primary structure & development (Ch 25)
Lab:  Lab Topics 22 Roots & 23 Primary structure of stems

Wk 10: Mar 25, 27, 29  EXAM II; Shoots & leaves: Primary structure & development (Ch 25)
Secondary growth in stems; Wood (Ch 26)
Lab:  Lab Topics 24 Leaves & 25 Woody stems & 26 Secondary xylem

Wk 11: Apr 1, 3, 5  Plant nutrition & soil (Ch 29)
Lab:  Lab Topics 18 Angiosperms (Flowers); 19 Angiosperms (Fruits)
Herbarium visit

Wk 12: Apr 8, 10, 12  Movements of water & solutes in plants (Ch 30)
Lab:  Water Relations Lab

Wk 13: Apr 15, 17, 19  Regulation of growth & development: Hormones (Ch 27)
Lab:  Lab Topic 29 Plant Nutrition

Wk 14: Apr 22, 24, 26  External factors & plant growth, movements and behavior (Ch 28)
Lab:  Lab Topic 27 Growth regulators
Wk 15: Apr 29  May 1, 3  Recombinant DNA technology, biotechnology & genomics (Ch 10); EXAM III

Lab: Lab Topic 28  External factors and plant growth; GMO Food Testing

Wk 16: May 6  Plants & Society/Current Topics

Wk 18: Wed May 15  FINAL EXAM  8:00-10:30 AM

Laboratory TA:  Leah Rhyne

Office Location & Hrs:  CS 240  HRS TBD