PLANT FORM AND FUNCTION
BIOLOGY 3455.001 (Labs .101/.102)

Department of Life Sciences
Spring 2018

A. COURSE INFORMATION

Course number/section: BIOL 3455.001
Class meeting time: M, W, F 9:00-9:50; (Lab: W 2-4:50)
Class location: IH 162  (Labs: CS 240)
Course Website: See BlackBoard (https://bb9.tamucc.edu/)

B. INSTRUCTOR INFORMATION

Instructor: Kirk Cammarata
Office location: EN 319 B  (Research Lab: CS 127)
Office hours: M, W, F 10:05-11:45
Telephone: 361-825-2468
e-mail: kirk.cammarata@tamucc.edu
Appointments: Email or call to check on my availability at other times or to make an appointment

Laboratory Instructors and Contact Info:
   Section .101       Melissa Fisher  mfisher5@islander.tamucc.edu

C. COURSE DESCRIPTION

Catalog 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.

Extended Course Description
This course emphasizes how plants work, through studies of their structure and function. The anatomy and unique cellular features of vegetative and reproductive organs of plants are reviewed. Emphasis will be placed on the physiological mechanisms used by plants, including water relations, nutrient assimilation, photosynthesis, growth, signaling and adaptation to the environment. Laboratory includes studies of major anatomical features, growth responses to environmental conditions, water relations, photosynthesis measurements, and response to hormones. Biotechnological modification of crop plants will be discussed and food will be tested for GMO content.
D. **PREREQUISITES AND COREQUISITES**

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

**Corequisites**
You MUST Register for SMTE 0091 (Lab Safety) – Or you will not be allowed in lab!

E. **REQUIRED TEXTBOOK(S), READINGS, RESOURCES AND SUPPLIES**

**Required Textbook**
*Biology of Plants, 8th Ed. by Raven, Evert & Eichorn (2013) W.H. Freeman and Co., NY, NY*  
(Also available as rental or E-Book)

**Other Resources**
*Companion Website: [www.whfreeman.com/raven](http://www.whfreeman.com/raven)* (many student resources, videos and study-aids)

**BlackBoard:** Course-associated site for messaging, quizzes, posting PPT notes, supplementary materials and readings, video-recordings, links to resources, labs, data, announcements, etc. You MUST use this resource and READ email sent to class! Please get your access figured out ASAP! [CHECK YOUR JUNK FOLDER!]

Call the IT Help desk for assistance: (361) 825-2692 (local); (866) 353-2491 (toll free); email: computer.helpline@tamucc.edu; internet: Submit a Ticket

TUTORIALS: Island Online: [https://iol.tamucc.edu/](https://iol.tamucc.edu/) ; IT website: [http://it.tamucc.edu/](http://it.tamucc.edu/)

If you haven't already prepared your computer for Blackboard, access Blackboard Technical Requirements and follow the directions.

You should subscribe to the Opportunities Listserv by sending a message to: “opportunities-list-request@listserv.tamucc.edu” with “subscribe” in the subject line. This service provides notification of scholarships, research and volunteer opportunities and science-related job opportunities.

**List of Supplies**
*You will need use of a computer with internet access.*

*For laboratory: notebook, “sharpie”, calculator, laboratory coat, and safety glasses.*

For field trips, weather- and location- specific clothing will be required. Such items will be discussed in-class or in-lab, and a preparation list posted to BlackBoard.

F. **STUDENT LEARNING OUTCOMES AND ASSESSMENT**

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what
students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

**Upon successful completion of this course, students should be able to:**

1. Describe and distinguish plant cell structure and tissue types
2. Describe the anatomy of the plant body, including roots, stems, leaves, flowers, fruits and seeds
3. Describe transport processes and mechanisms for both water and solutes, and the relationship of these processes to photosynthesis
4. Describe plant nutritional requirements and assimilation
5. Describe and distinguish photosynthetic energy transformations, their measurement, and their regulation
6. Describe and distinguish growth, development and environmental response processes, including hormones, circadian rhythms, tropisms, photoperiodism, nastic movements and dormancy
7. Describe key historical accomplishments in agriculture, and the importance of and challenges to agriculture for food, fuel and environment
8. Describe issues and applications of recombinant DNA technology and biotechnology

**G. INSTRUCTIONAL METHODS AND ACTIVITIES**

This course will utilize traditional lecture, in-class demonstrations/animations, homeworks, question and answer sessions, reflective learning, application readings and coordinated laboratory and field trip learning experiences to: 1) explore the relationships of plants to humans and their environment; 2) study the relationships between plant structure and function; and 3) experience how plant biologists study and manipulate plants.

**H. MAJOR COURSE REQUIREMENTS AND GRADING**

The Student Learning Outcomes will be assessed through exams, homeworks, presentation projects and laboratory/field activities.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LECTURE</strong></td>
<td>75%</td>
</tr>
<tr>
<td>3 Exams</td>
<td>75</td>
</tr>
<tr>
<td>Assignments, Quizzes, Participation</td>
<td>25</td>
</tr>
<tr>
<td><strong>LABORATORY</strong></td>
<td>25%</td>
</tr>
<tr>
<td>Lab Reports</td>
<td>75</td>
</tr>
<tr>
<td>Assignments Participation</td>
<td>25</td>
</tr>
</tbody>
</table>
**Tentative Evaluation:** Your final grade will be based on the percentage you earn out of the total possible points, with lecture and laboratory weighted as specified. Individual extra credit is not possible, but bonus 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)**

I. **Lecture (75 %)**
   - 3 Exams @ 100 pts = 300
   - Assignments, Quizzes & Participation (Tentative) = 100

II. **Laboratory (25 %)**
   - Lab Reports/Assignments/Participation = 200

The time and grading 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, seminar attendance, 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:

\[(0.9 \times 75) + (0.8 \times 25) = (67.5) + (20) = 87.5/100 \text{ possible} = \text{B}\]

**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, read messages from the Listserv and to be aware of all assignments, deadlines, and changes.

**NOTE:** All Exams are the property of the Instructor as they must be saved for course records. Students may use the exams for study/reflection purposes during specified class or lab periods, but they must be returned to the Instructor upon demand. DO NOT LEAVE THE ROOM WITH OR COPY THE EXAMS IN ANY MANNER! Taking, photocopying, photographing, scanning, etc exams are all strictly forbidden! Cell phones, iWatches, cameras, scanners, or any course materials are NOT allowed in plain sight during exams. Violation of this policy will result in a “zero” score for the exam!

Exams will be a mixture of multiple choice, matching, fill-in the blank, short answer, labeling, calculations and essay questions. Questions may be relatively long and detailed compared to what you may have seen in some introductory courses. 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 3 (Wednesday, May 9 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. **Homeworks and other assignments** may be given in class. The other assignments may include group projects, data interpretation, experimental design, calculations, opinion papers, research article summaries, etc. They will generally be due at the start of lecture class the following week, **but some assignments will be in-class only and makeups are not possible**. 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.

All assignments and examination answers must be legible to the Instructor. Illegible answers will receive a “0”.

I. **COURSE CONTENT/SCHEDULE**

<table>
<thead>
<tr>
<th>Important Dates</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes Begin</td>
<td>Jan 16 (Tues)</td>
</tr>
<tr>
<td>Last day to register/Add</td>
<td>Jan 24</td>
</tr>
<tr>
<td>Spring Break</td>
<td>Mar 12-16</td>
</tr>
<tr>
<td>Last Day to Drop without record</td>
<td>Apr 6</td>
</tr>
<tr>
<td>Last Day to withdrawal</td>
<td>May 1</td>
</tr>
<tr>
<td>Last Class Day</td>
<td>May 2</td>
</tr>
<tr>
<td>Reading Day</td>
<td>May 3</td>
</tr>
<tr>
<td><strong>FINAL EXAM 3</strong></td>
<td><strong>Wed May 9 (8:00 – 10:30 AM)</strong></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wk1: Jan 17, 19</td>
<td>Syllabus; Overview; Molecular composition of plant cells, macromolecules, secondary metabolites (Ch 2)</td>
<td>Lab Safety/Intro; Plant seeds</td>
</tr>
<tr>
<td>Wk 2: Jan 22, 24, 26</td>
<td>Plant cell structure; Cell Walls (Ch 3)</td>
<td>Lab 2: Seeds &amp; plant cells</td>
</tr>
<tr>
<td>Wk 3: Jan 29, 31; Feb 2</td>
<td>Movement of substances into cells (Ch 4)</td>
<td>Lab 3: Water &amp; cells</td>
</tr>
<tr>
<td>Wk 4: Feb 5, 7, 9</td>
<td>Recombinant DNA technology, biotechnology &amp; genomics (Ch 10)</td>
<td>Lab 4: Plant Propagation I</td>
</tr>
<tr>
<td>Wk 5: Feb 12, 14, 16</td>
<td>Cells, tissues of the plant body (Ch 22 pp 530-2, 534-7; Ch 23)</td>
<td>Lab 5: Cells &amp; tissues of plants</td>
</tr>
<tr>
<td>Wk 6: Feb 19, 21, 23</td>
<td>Roots: Structure &amp; development (Ch 24); EXAM I (Fri Feb 23; Ch 2-4, 10, 23)</td>
<td>Lab 6: Biotechnology I: GMO testing</td>
</tr>
<tr>
<td>EXAM I</td>
<td>Shoots: Primary structure &amp; development (Ch 25); Embryo and seed maturation (Ch 22 pp 530-2, 534-7)</td>
<td>Lab 7: Biotechnology II: Gel analysis</td>
</tr>
<tr>
<td>Wk 7: Feb 26, 28; Mar 2</td>
<td>Secondary growth in stems (Ch 26)</td>
<td>Lab 8: Roots, stems &amp; secondary growth</td>
</tr>
<tr>
<td>Wk 8: Mar 5, 7, 9</td>
<td>SPRING BREAK!</td>
<td></td>
</tr>
<tr>
<td>Wk 9: Mar 12-16</td>
<td>Photosynthesis (Ch 7)</td>
<td>Lab 9: Leaves, flowers, fruits &amp; seeds</td>
</tr>
<tr>
<td>Wk 10: Mar 19, 21, 23</td>
<td>Regulating growth and development: Plant hormones (Ch 27)</td>
<td>Lab 10: Photosynthesis</td>
</tr>
<tr>
<td>Wk 11: Mar 26, 28, 30</td>
<td>External factors and plant growth (Ch 28) EXAM II (Fri Apr 6; Ch 22, 24-26, 7)</td>
<td>Lab 11: Projects</td>
</tr>
<tr>
<td>Wk 12: Apr 2, 4, 6</td>
<td>Plant nutrition and soils (Ch 29)</td>
<td>Lab 12: Projects</td>
</tr>
<tr>
<td>EXAM II</td>
<td>Movement of water and solutes through plants (Ch 30)</td>
<td>Lab 13: Projects</td>
</tr>
<tr>
<td>Wk 13: Apr 9, 11, 13</td>
<td>Plants and people (Ch 21)</td>
<td>Lab 14: Whole-plant water relations</td>
</tr>
<tr>
<td>Wk 14: Apr 16, 18, 20</td>
<td>Wrap-up</td>
<td>Lab 15: Cleanup; Presentations</td>
</tr>
<tr>
<td>Wk 15: Apr 23, 25, 27</td>
<td>FINAL EXAM 3; 8:00 – 10:30 AM</td>
<td>FINAL EXAM 3</td>
</tr>
<tr>
<td>Wk 16: Apr 30; May 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wk 17: May 9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The time and point schedule may require adjustment. Additional assignments may or may not be provided at the Instructor’s discretion. Such assignments might include homeworks, group projects, reading assignments, quizzes, etc. 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, subscribe to the listserv, and regularly visit BlackBoard to be aware of all assignments, deadlines, and changes to such.**

**Possible Topics For Lab Projects:**
- Plant nutritional deficiencies
- Plant identification through DNA sequence analysis & bioinformatics
- Photosynthesis: Oxygen evolution measurements
- Photosynthesis: Carbon dioxide exchange measurements
- Photosynthesis: In vitro electron transport measurements
- Hormone responses
- Tropisms, nastic responses & morphological changes
- Grafting
- Plant water relations experiments and demonstrations
Other Course Requirements:

1. All Exams are the property of the Instructor as they will be saved for course records.
2. All students must access BlackBoard on a regular basis, as well as READ their TAMUCC email, to watch for class announcements, changes, and for laboratory materials, readings, etc.

For help with access to BlackBoard, email or internet, please contact the IT Helpdesk by phone (825-2692) or electronically (computer.helpline@tamucc.edu; http://it.tamucc.edu/selfservice/index.html)

3. Attendance at lecture and lab, preparedness and participation in all learning activities is required and counts towards your participation points. Assignments cannot be made up later if absent without a recognized excuse (see below).

J. COURSE POLICIES

Attendance/Tardiness

Attendance is the student’s responsibility. You are responsible for the material covered in every lecture or online activity, regardless of your (lack of) attendance or participation. 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 (non-emergency medical visits, parent-teacher conferences, household or auto repairs) should be scheduled to avoid conflicts with class. Plane tickets booked to conflict with class do NOT constitute an excusable absence. An acceptable excuse must be:

• from an appropriate source (doctor, dentist, funeral director) who states the nature (within privacy limits) and dates of the event
• in writing, on official letterhead, and signed (it will not be returned)
• presented prior to, or within 3 days of, the absence

Late Work and Make-up Exams

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 (non-emergency medical visits, parent-teacher conferences, household or auto repairs) should be scheduled to avoid conflicts with class. Plane tickets booked to conflict with class do NOT constitute an excusable absence. An acceptable excuse must be:

• from an appropriate source (doctor, dentist, funeral director) who states the nature and dates of the event
• in writing, on official letterhead, and signed (it will not be returned)
• presented prior to, or within 3 days of, the absence

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.
Extra Credit
Extra credit is provided in the form of occasional built-in exam points or impromptu assignments (eg seminar attendance). However, these opportunities are solely at the instructor’s discretion and available to the entire class. **NO SPECIAL EXCEPTIONS/ASSIGNMENTS FOR INDIVIDUALS. Please do not ask. Use your energy and focus to do it right the first time.**

Cell Phone Use
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, etc). **Turn it off unless specifically being used for class.**

Participation
All students are expected to attend the full class and lab periods, complete all learning assignments, complete reading assignments fully and carefully, and to participate in class discussions. A portion of your grade is earned by participation. You must show up and be attentive.

Expectations:
You are responsible for your own education. Take notes in class, during lab discussions, and when completing assignments. Be Proactive! Ask questions when you have them and seek help when you need it. The instructor is here to help you. Be aware of university-imposed deadlines (ie drop dates).

K. COLLEGE AND UNIVERSITY POLICIES

- **Academic Integrity (University)**
  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 a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students
engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course. Please consult with the instructor before you decide to drop to be sure it is the best thing to do. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Should dropping the course be the best course of action, visit the Office of the University Registrar for the **Course Drop Form that must submitted**. No student is eligible to receive a W without completing the official drop process by this deadline. Please consult the Academic Calendar ([http://www.tamucc.edu/academics/calendar/](http://www.tamucc.edu/academics/calendar/)) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, 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 Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  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 (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

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.

http://disabilityservices.tamucc.edu/

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.