**DEPARTMENT:** BIOLOGICAL SCIENCES  
**COLLEGE:** Charles E. Schmidt College of Science

**RECOMMENDED COURSE IDENTIFICATION:**
<table>
<thead>
<tr>
<th>PREFIX</th>
<th>BOT</th>
<th>COURSE NUMBER</th>
<th>6506</th>
<th>LAB CODE (L or C)</th>
<th>L</th>
</tr>
</thead>
</table>
*(TO OBTAIN A COURSE NUMBER, CONTACT MJENNING@FAU.EDU)*

**COMPLETE COURSE TITLE:** ADVANCED PLANT PHYSIOLOGY LABORATORY

**EFFECTIVE DATE**
*first term course will be offered*
SUMMER, 2016

**CREDITS:** 2

**TEXTBOOK INFORMATION:**
Lab manual written by Dr. Xing-Hai Zhang posted via Blackboard

**GRADING** *(SELECT ONLY ONE GRADING OPTION):*
| REGULAR | X | Satisfactory/Unsatisfactory |

**COURSE DESCRIPTION, NO MORE THAN THREE LINES:**
This course uses a series of lab exercises to help students to better understand the principles of plant physiology. It focuses on hands-on training in experimental skills and learning of experiment design, research tools and methodology.

**PREREQUISITES:**
enrolled graduate students or instructor’s permission

**COREQUISITES:**
NONE

**REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL):**
GRADUATE LEVEL OR INSTRUCTOR’S PERMISSION

*PREREQUISITES, COREQUISITES AND REGISTRATION CONTROLS WILL BE ENFORCED FOR ALL COURSE SECTIONS.*

**MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:** PhD DEGREE IN PLANT BIOLOGY, WITH SPECIALIZATION IN PLANT PHYSIOLOGY, PLANT BIOCHEMISTRY AND PLANT MOLECULAR BIOLOGY, CONTINGENT UPON DEPARTMENTAL APPROVAL

Faculty contact, email and complete phone number:
Dr. Xing-Hai Zhang  
[Email]
xhzhang@fau.edu  
561-297-1011

Please consult and list departments that might be affected by the new course and attach comments.

**THIS IS THE ONLY GRADUATE LEVEL PLANT PHYSIOLOGY LAB COURSE TAUGHT AT FAU. NO CONFLICT WITH OTHER DEPARTMENTS OR COLLEGES.**

Approved by:

**Date:** 02-09-16

1. Syllabus must be attached; see guidelines for requirements:  

2. Review Provost Memorandum:  
Definition of a Credit Hour  
www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf

3. Consent from affected departments  
(attach if necessary)
TO: University Graduate Programs Committee (UGPC)
FROM: Rodney Murphey, Ph.D.
Professor and Chair
Department of Biological Sciences
DATE: February 8th, 2016
RE: New Course Proposal Consent

To Whom It May Concern:

This note constitutes acknowledgement and consent of the Department of Biological Sciences for the creation of a new course within the department: **BOT 6506L: Advanced Plant Physiology Lab.**

Best Regards,

Rodney Murphey, Ph.D.
Chairman, Department of Biological Sciences
Director, Life Science Initiative on the MacArthur Campus
Email this form and syllabus to UGPC@fau.edu one week before the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website prior to the meeting.

FAUcourseGrad—Revised September 2013
Dear Departmental Graduate/Undergraduate Program Committee,

I have asked Dr. Janet Blanks (The Center for Complex Systems), Dr. David Wolgin (Psychology), Dr. Marc Kantorow (College of Medicine) and Dr. Jerry Haky (Chemistry). I have got no response from Blanks. All others express no objection (see below) to my new courses “Advanced Plant Physiology” and “Advanced Plant Physiology Laboratory”.

Thank you for consideration.

Xing-Hai Zhang

Followings are their responses:

David Wolgin <wolgindl@fau.edu> Wed, Oct 8, 2014 at 1:03 PM

To: Xing-hai Zhang <xhzhang@fau.edu>

The Dept. of Psychology has no objections to adopting these courses.

    David L. Wolgin, Chair

Sent from my iPhone

Jerome Haky <hakyj@fau.edu> Thu, Oct 9, 2014 at 11:36 AM

To: Xing-hai Zhang <xhzhang@fau.edu>

Dear Dr. Zhang,

The Department of Chemistry and Biochemistry has no objections to these courses.

    Jerome E. Haky, Ph.D.
    InterimChair
    Department of Chemistry and Biochemistry
    Florida Atlantic University
    777 Glades Road
    Boca Raton, FL 33431
    561-297-3338
Thursday, October 9th, 2014

To: Charles E. Schmidt College of Science
   Biology Department

The Biomedical Science Department in the Charles E. Schmidt College of Medicine has reviewed the new Biology course proposals for BOT 6506 (2 CREDITS) - ADVANCED PLANT PHYSIOLOGY and BOT 6506L (2 CREDITS) - ADVANCED PLANT PHYSIOLOGY LABORATORY, and does not have any objections to the proposed courses. The courses do not contain any material that could constitute a conflict with our Biomedical Science Graduate program curriculum.

Sincerely,

Marc Kantorow, Ph.D.
Professor and Director of Graduate Programs
Charles E. Schmidt College of Medicine
Florida Atlantic University
777 Glades Rd.
Boca Raton, FL 33431
561-297-2910
BOT 6506L (2 CREDITS)
ADVANCED PLANT PHYSIOLOGY LABORATORY
May 11 May 11 -June 22, 2016
12:30-3:30 pm, M, W, F, Sanson Science 108, Boca Raton
Department of Biological Sciences
Charles E. Schmidt College of Science, Florida Atlantic University

Teaching Assistants:
xxxx, SC 259, e-mail: xxx@my.fau.edu
xxxx, SC 259, e-mail: xxxx@my.fau.edu
Office Hours for TAs: M, W 3:30-4:30 pm, F 10:30 am-12:30 pm or by appointment (you should be able to see either of the two TAs)

Instructor: Dr. Xing-Hai Zhang, SC 262, Phone: 561-297-1011, e-mail: xhzhang@fau.edu

Required Textbook: Lab manual online via Blackboard. You print it out and bring to the lab.

Prerequisites: enrolled graduate students or instructor's permission.

Course Description
This course uses a series of lab exercises to help students to better understand the principles of plant physiology. Its main focus is hands-on training in experimental skills and learning of experiment design, research tools and methodology.

Course Objectives
To help you better understand about the lectures (BOT 6506) with hands-on experiments.
To introduce to you some of the research methods and techniques used in plant biology.
To provide an opportunity to improve your scientific writing skills.
To create a lab environment for you to experience scientific research and culture.
Students are expected to study for a minimum of two hours for every hour of class time.

Course Content (Changes/rearrangements are possible.)
Laboratory Safety
Scientific Research
Ethics in Science
Microscope
Cell Structure
The Organelles
The Cell Boundary
Cell Membrane and Water Movement
Water Movement-Diffusion
Photosynthesis
Plant Respiration
Mineral Nutrition
Plant Growth, Light and Gravity
Seed Germination, Hormones and Phytochrome
Enzymes-Biological Catalysts (Polyphenoloxidase)
Plant Biochemistry-Isolation and Measurement of Proteins from Plant Tissues
Visualization of Transgene Action
Segregation of Transgenes and Homozygocity
Isolation and PCR Analysis of DNA from Plant Cells

Lab Exercise

Lab sections are administrated and graded by the TAs, supervised by Dr. Zhang. This is a very important part of learning not only to help you better understand some of the concepts conveyed in the lectures, but also to provide a basic training of research skills and give you a "feel" of working in a research lab. Each student must bring the lab manual (protocols) and a notebook to each class. Lab report and notebook are important components of the final grade.

You will work together with your partner to do each project throughout the semester. You are required to write 2 full length, formal lab reports. The topics, due dates and requirements will be announced in advance. Late papers will receive a penalty of 10 points per day late. After a graded report is returned to class, you will have one week to discuss with the TA and, if necessary, the instructor.

There will be five quizzes throughout the course. These quizzes will cover lab-related contents and may be cumulative. Your understanding of the knowledge, procedures and observations involved in the lab experiments will be tested. There are no make-up quizzes and a score of zero will be recorded for each missing quiz.

Lab worksheets will be handed in at the end of the lab and will be returned to you promptly. Missing, unfinished, altered or grossly erroneous record of lab exercises will receive a penalty of up to 10 points per experiment.

Attendance Policy

Please observe the relevant chapters of the FAU Graduate Catalog. Since each lab exercise requires your participation and cannot be easily made up, attendance is MANDATORY. Absence can be excused only with valid written documentation and by following proper procedures. Absence of the lab class without valid documents will receive a penalty of 30 points per class. Absence can be excused only under certain circumstances and with written documentations. Valid situations include a reasonable number of participation in jury duty, FAU-approved activities, and religious observance, but students must discuss with the TA to arrange make-up experiments as feasibly possible.
Grading

Your final grade will be based on 500 points.

- Five quizzes: 250 points.
- Lab report written as a scientific research paper: 100 points.
- Special topic review paper: 50 points.
- Lab worksheets & Lab notebook: 100 points.
- Attendance: 30 points will be deducted for every lab class missed.

Tentative Course Schedule

- Note: Schedule adjustments may be needed as we progress through the course

<table>
<thead>
<tr>
<th>Date</th>
<th>Experiment Topic</th>
<th>Lab Manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 11</td>
<td>Seed germination, Microscope, Cell structure</td>
<td>Chap 1, 2, 12</td>
</tr>
<tr>
<td>May 13</td>
<td>Plant cloning, Tissue culture</td>
<td>Chap 16</td>
</tr>
<tr>
<td>May 15</td>
<td>Organelles, Cell Boundary</td>
<td>Chap 3, 4</td>
</tr>
<tr>
<td>May 18</td>
<td>Quiz 1, Membrane, Water movement</td>
<td>hap 5, 6</td>
</tr>
<tr>
<td>May 20</td>
<td>Heat potential, light, gravity</td>
<td>Chap 7, 8</td>
</tr>
<tr>
<td>May 22</td>
<td>Photosynthesis</td>
<td>Chap 9</td>
</tr>
<tr>
<td>May 25</td>
<td>Plant respiration</td>
<td>Chap 10</td>
</tr>
<tr>
<td>May 27</td>
<td>Mineral Nutrition</td>
<td>Chap 11</td>
</tr>
<tr>
<td>May 29</td>
<td>Quiz 2, Tissue culture, hormones, phytochrome</td>
<td>Chap 12, 16</td>
</tr>
<tr>
<td>June 1</td>
<td>Senescence, Enzymes</td>
<td>Chap 13, 14</td>
</tr>
<tr>
<td>June 3</td>
<td>Protein analysis</td>
<td>Chap 15</td>
</tr>
<tr>
<td>June 5</td>
<td>Quiz 3, More tissue culture</td>
<td>Chap 16</td>
</tr>
<tr>
<td>June 6</td>
<td>Transgene analysis</td>
<td>Chap 17</td>
</tr>
<tr>
<td>June 10</td>
<td>Genetic segregation</td>
<td>Chap 18</td>
</tr>
<tr>
<td>June 12</td>
<td>Quiz 4, DNA extraction from leaves, PCR analysis</td>
<td>Chap 19</td>
</tr>
<tr>
<td>June 15</td>
<td>Gel electrophoresis, DNA extraction from strawberry</td>
<td>hap 20</td>
</tr>
<tr>
<td>June 17</td>
<td>Overview lab report</td>
<td></td>
</tr>
<tr>
<td>June 19</td>
<td>Quiz 5, hand in report, notebook</td>
<td></td>
</tr>
<tr>
<td>June 22</td>
<td>Return lab reports and notebooks, clean up</td>
<td></td>
</tr>
</tbody>
</table>
### Assignment of Grades

<table>
<thead>
<tr>
<th>Point Range</th>
<th>Percentage</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>555-600</td>
<td>93-100%</td>
<td>A</td>
</tr>
<tr>
<td>537-554</td>
<td>90-92%</td>
<td>A-</td>
</tr>
<tr>
<td>519-536</td>
<td>87-89%</td>
<td>B+</td>
</tr>
<tr>
<td>495-518</td>
<td>83-86%</td>
<td>B</td>
</tr>
<tr>
<td>477-494</td>
<td>80-82%</td>
<td>B-</td>
</tr>
<tr>
<td>459-476</td>
<td>77-79%</td>
<td>C+</td>
</tr>
<tr>
<td>435-458</td>
<td>73-76%</td>
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<tr>
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<td>357-374</td>
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<td>D-</td>
</tr>
<tr>
<td>356 or less</td>
<td>59% or less</td>
<td>F</td>
</tr>
</tbody>
</table>

### Incomplete Grades

Students should be aware that a grade of I (incomplete) will be given only under specific circumstances and through certain procedures. For the FAU policy on "I" grade, please consult with *FAU Graduate Catalog*.

### Grade Reporting

Graded quizzes and report will be returned to the class as soon as possible. The final grades may be posted online. Instructors are not allowed to discuss grades over the telephone or e-mail with anyone, please meet in person to inquire about a grade.

### Code of Academic Integrity

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001. For this class, use of internet for learning is very helpful for your study and is strongly encouraged. But copying/plagiarizing in any way is wrong and is not permitted. In lab exercises you will work with a partner and will share the data obtained. However, your lab note and report must be the work of your own.

### Classroom Etiquette

Coming late to class is disruptive and rude, particularly to your partner and perhaps costly. No eating, drinking or any other disruptive behaviors are allowed in the lab. Lab safety and cleanup will be strictly observed. Close attentions to the instructions of TAs are required. Being considerate and respectful is always appreciated.
Support Available

Lab course often brings a relaxed and informal environment. You should apply your motor skills as well as your intelligent judgment to each experiment. Enjoy it while you learn something important from each experiment. However, if you experience any difficulty in this course for any reason, please do not hesitate to consult with the TAs or Dr. Zhang. We will try our best to help you.

Students with Disabilities

In compliance with the Americans with Disabilities Act (ADA), students who require reasonable accommodations due to a disability to properly execute coursework must register with the Office of Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU’s campuses - Boca Raton, Davie, and Jupiter; however, disability services are available for students on all campuses.