Biol26a: Plant Biology  
Spring 2018  
Professor: Melissa Kosinski-Collins, SSC 016A, kosinski@brandeis.edu  
Office Hours: *******  
TA: *******

Class Meeting Time: M, W, Th 9-9:50

Summary:

Biol26a is designed for students who have taken Bio14 and Bio15 and are interested in learning the fundamentals of plant biology. The course is intended for students who are familiar with central dogma, structure-function relationship and genetic inheritance, but have not yet applied those concepts in plant systems.

We will adopt a molecular and chemical approach as we explore various concepts in plant biology including plant metabolism, structure-function, development, genetics, pathology and taxonomy.

Prerequisite: Biol14 and Biol15

Learning Objectives:

After completion of this course students should be able to:

- Articulate the main biochemical and cellular features that characterize plants.
- Describe the general metabolic processes inherent to plant cells.
- Describe the basic steps of reproduction/development and demonstrate conceptual understanding of plant heredity as it relates to evolution
- Classify and identify plant structures.
- Describe several advances in plant biotechnology and agricultural practices and their impact on society.

Course Format:

This course will meet three times a week in 50-minute blocks. The class will consist of lectures, in-class hands-on activities, case studies, and discussions. Because a large element of this class involves labs, discussion and collaborative learning modules, attendance is required. Written homework problems will be assigned periodically. You are required to complete and turn in all homework problems to receive credit for the problem set and participation portion of your grade. Several times throughout the semester, you will be asked to read a peer-reviewed paper and be prepared to discuss the article in class. You are required to submit two discussion questions to the professor via email on the night before the discussion class. Submission of your discussion questions will be part of your homework grade. Additionally, this class will routinely involve group discussion and debate. You will be expected to research information and be prepared to participate in these sessions actively. Your participation grade will stem from your attendance, your ability to participate in these discussions and provide insightful feedback to other students.
You may not pass in any homework assignments late as we will discuss them in class the day they are due.

If you have a documented learning disability and would like to have an accommodation made in taking this class, please inform the professor immediately.

**Academic Integrity:**

Conduct inconsistent with the policies on academic honesty in "Rights and Responsibilities" will be treated seriously.

**Textbook:**

There is no required textbook for this course. Required course material and reading will be posted periodically on the course website. It may be beneficial to have any introductory biology textbook available as a background reference text if needed.

In addition, students should have access to an introductory plant biology text. The supplementary readings posted will come from the text below: *Raven, Biology of Plants.* 2016. Freeman.

**Grading:**

Your grade for the course will be determined by your scores on 2, fifty-minute in class quizzes, lab reports, homework, class participation and a final written project which you must present in class.

*Quizzes:* Each quiz will be 10% of your grade. Quizzes will be administered on ***** and ******.

*Lab Reports:* Your lab reports will consist post lab assignments. Post labs may be individual or completed collaboratively as indicated. The portion of your post lab to be uploaded will be listed under the “Results and Discussion” section of the lab. Lab reports will be worth 20% of your grade.

*Homework:* Your homework will consist of readings, pre-labs, and completion of in class assignments. Homework will periodically be assigned and collected and will help prepare you for the following class topic(s). For each homework assignment, you are required to hand-in two discussion questions regarding the paper by 9 am on the date of the assignment. Please upload these questions onto the course Latte site. No late homework will be accepted. Homework will be worth 10%.

*Case studies:* We will occasionally complete case studies as part of class. Uploaded answers to these case studies will be worth 10% of your final grade.

*Final Project:* Your final project will be 30% of your grade.
Class participation: Because part of your grade is based on participation, you are required to attend and to be prepared for all lectures, labs and discussions. Participation will routinely involve giving either formal or informal presentations during the class period. Periodically throughout the semester on unannounced days, attendance will be taken at the beginning of class (8:00 am). Students either late or absent will lose participation points for the day.

Four-Credit Course (with three hours of class-time per week)

Success in this 4-credit hour course is based on the expectation that students will spend a minimum of 9 hours of study time per week in preparation for class (readings, papers, discussion sections, preparation for quizzes, etc.).
## Syllabus Schedule:

<table>
<thead>
<tr>
<th>DATE</th>
<th>Topic/Agenda</th>
<th>Homework Due</th>
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<tbody>
<tr>
<td>January 10</td>
<td>Syllabus review&lt;br&gt;Case Study: Osmosis and Diffusion</td>
<td>Gummy bear osmosis</td>
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<tr>
<td>January 11</td>
<td><strong>LAB DAY: Ecology and taxonomy of plants</strong></td>
<td>Collection and classification of plants&lt;br&gt;Prelab 1</td>
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<td>January 15</td>
<td>MLK Day</td>
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<td>January 17</td>
<td><strong>LAB DAY: Composition of Plant cells</strong></td>
<td>Elodea, onion cells, volvox&lt;br&gt;Prelab 2</td>
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<tr>
<td>January 18</td>
<td>Plant cell structures and biomolecular composition</td>
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<td>January 22</td>
<td><strong>LAB DAY: Photosynthesis and Respiration in Elodea I</strong></td>
<td>Carbon dioxide production in Elodea &lt;br&gt;Prelab 3</td>
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<tr>
<td>January 24</td>
<td><strong>LAB DAY: Photosynthesis and Respiration in Elodea II</strong></td>
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<td>January 25</td>
<td>Informational Literacy Workshop 1</td>
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<tr>
<td>January 29</td>
<td>Case Study on Photosynthesis</td>
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<td>January 31</td>
<td>Informational Literacy Workshop 2</td>
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<tr>
<td>February 1</td>
<td>Energetics: Metabolism and Respiration</td>
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<tr>
<td>February 5</td>
<td><strong>LAB DAY: Observation of plant anatomy</strong></td>
<td>Slides of plant cells&lt;br&gt;Prelab 4</td>
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<td>February 8</td>
<td>Xylem and Phloem transport&lt;br&gt;Moncots vs. Dicots</td>
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<td>February 12</td>
<td>The Plant Body: Shoots and Roots</td>
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<tr>
<td>February 14</td>
<td>The Plant Body: Leaves</td>
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<td>February 15</td>
<td>Case Study on Sugar Beets</td>
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<td>February 26</td>
<td><strong>LAB DAY: Stomata Tracking</strong></td>
<td>Leaves from various plants&lt;br&gt;Prelab 6</td>
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<td>February 28</td>
<td>Informational Literacy Workshop 3</td>
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<td>March 1</td>
<td>QUIZ 1</td>
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<td>March 5</td>
<td><strong>LAB DAY: Flower and seed dissection I</strong></td>
<td>Flowers, Lima beans and corn&lt;br&gt;Prelab 7</td>
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<tr>
<td>March 7</td>
<td><strong>LAB DAY: Flower and seed dissection II</strong></td>
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<td>March 8</td>
<td>Flowers and reproduction&lt;br&gt;Gymnosperms and angiosperms</td>
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<td>Date</td>
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<td>March 14</td>
<td>Mineral Nutrition</td>
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<td>March 15</td>
<td>Hormones</td>
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<td>March 19</td>
<td>LAB DAY: Hormones I</td>
<td>Prelab 8</td>
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<td>March 21</td>
<td>LAB DAY: Hormones II</td>
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<td>March 26</td>
<td>Vegetative reproduction</td>
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<td>March 28</td>
<td>Reproduction</td>
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<td>April 9</td>
<td>Plant development</td>
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<td>April 11</td>
<td>Case study on tougher plants</td>
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<tr>
<td>April 12</td>
<td>Plant disease</td>
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<td>April 16</td>
<td>Case study on plant pathology</td>
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<td>April 18</td>
<td>Case study on sunflowers</td>
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<tr>
<td>April 19</td>
<td>Presentations (8-9:50 am)</td>
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<td>April 23</td>
<td>Presentations (8-9:50 am)</td>
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<td>April 25</td>
<td><strong>Lab Day: Goldenrod ecosystems</strong></td>
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<td>Final Exam Period</td>
<td>Quiz 2</td>
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