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BOROUGH OF MANHATTAN COMMUNITY COLLEGE
The City University of New York
Department of Science

PLANT BIOLOGY BIO 270
Lecture Hours per Week: 3
Laboratory Hours per Week: 3

Class Hours: 6

Semester: Spring 2019

Instructor Information (Phone #, Office #, Email, Office hours):

Credits: 4

Course description: This course is designed to provide students with the fundamentals of plant biology such as anatomy, morphology, growth and development, reproduction, genetics, physiology, plant ecology and an overview of evolution and the importance of plants in society. This course includes hands on laboratory experience and life plant materials integrated with the lecture content.

Basic Skills Requirements: MAT 056
Prerequisites: BIO 220
Corequisites: CHE 202 or department approval

<table>
<thead>
<tr>
<th>Course Student Learning Outcomes</th>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will solve problems using the scientific method and critical thinking</td>
<td>Written laboratory reports and assignments</td>
</tr>
<tr>
<td>Students will compare and contrast structure and function in plants</td>
<td>Quizzes and examinations</td>
</tr>
<tr>
<td>Students will describe and discuss plant evolution and the importance of plants in our world</td>
<td>Quizzes and examinations</td>
</tr>
<tr>
<td>Students will discuss or compare the advantages of different methods of propagation of plants</td>
<td>Quizzes and examinations</td>
</tr>
</tbody>
</table>

Below are the College’s general education learning outcomes that will be assessed in this course.

<table>
<thead>
<tr>
<th>General Education Learning Outcomes</th>
<th>Measurements (means of assessment for general education goals listed in first column)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X Communication skills- students will be able to write, read, listen and speak critically and effectively</td>
<td>Presentation of a Research paper</td>
</tr>
<tr>
<td>X Scientific Reasoning- Students will be able to apply the concepts and methods of the natural sciences.</td>
<td>Students will conduct hypothesis-driven laboratory experiments and report and analyze the results.</td>
</tr>
</tbody>
</table>

Required text:
Handouts with lab exercises will be distributed.

Use of Technology:
Blackboard and Turnitin.com may be used at the instructor’s discretion.
Evaluation and Requirements of Students:
The course will be graded in the following way:
Lecture: The course will have four lecture exams and a final examination that will be worth 70% of the total grade.
Laboratory: Laboratory exercises will be evaluated by periodic quizzes (oral and written), lab reports and a research presentation. These together will count for 30% of the total grade.

TO PASS THIS CLASS, A STUDENT MUST HAVE A PASSING GRADE OF 60% OR MORE IN LECTURE AND A PASSING GRADE OF 60% OR MORE IN THE LABORATORY PORTION.

Class Participation
Participation in the academic activity of each course is a significant component of the learning process and plays a major role in determining overall student academic achievement. Academic activities may include, but are not limited to, attending class, submitting assignments, engaging in in-class or online activities, taking exams, and/or participating in group work. Each instructor has the right to establish their own class participation policy, and it is each student’s responsibility to be familiar with and follow the participation policies for each course.

BMCC is committed to the health and well-being of all students. It is common for everyone to seek assistance at some point in their life, and there are free and confidential services on campus that can help.

Single Stop www.bmcc.cuny.edu/singlestop, room S230, 212-220-8195. If you are having problems with food or housing insecurity, finances, health insurance or anything else that might get in the way of your studies at BMCC, come by the Single Stop Office for advice and assistance. Assistance is also available through the Office of Student Affairs, S350, 212-220-8130.

Counseling Center www.bmcc.cuny.edu/counseling, room S343, 212-220-8140. Counselors assist students in addressing psychological and adjustment issues (i.e., depression, anxiety, and relationships) and can help with stress, time management and more. Counselors are available for walk-in visits.

Office of Compliance and Diversity www.bmcc.cuny.edu/aac, room S701, 212-220-1236. BMCC is committed to promoting a diverse and inclusive learning environment free of unlawful discrimination/harassment, including sexual harassment, where all students are treated fairly. For information about BMCC’s policies and resources, or to request additional assistance in this area, please visit or call the office, or email olevy@bmcc.cuny.edu, or twade@bmcc.cuny.edu. If you need immediate assistance, please contact BMCC Public safety at 212-220-8080.

Office of Accessibility www.bmcc.cuny.edu/accessibility, room N360 (accessible entrance: 77 Harrison Street), 212-220-8180. This office collaborates with students who have documented disabilities, to coordinate support services, reasonable accommodations, and programs that enable equal access to education and college life. To request an accommodation due to a documented disability, please visit or call the office.

BMCC Policy on Plagiarism and Academic Integrity Statement
Plagiarism is the presentation of someone else’s ideas, words or artistic, scientific, or technical work as one’s own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism. Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC’s Web site, www.bmcc.cuny.edu. For further information on integrity and behavior, please consult the college bulletin (also available online).
LECTURE SYLLABUS

Week | Topic | Chapter
--- | --- | ---
1 | What is plant biology? | 1

2 | Molecular composition of Plant cells | 2

3 | Plant Cell and the cell cycle | 3

4 | Plant Tissues | 23

5 | Roots and soils. Symbiotic relationships between plant and fungi or bacteria | 24

6 | The shoot: Primary structure and development. Secondary growth in stems | 25, 26

7 | Plant Nutrition and soils and the movement of water and solutes in plants | 29, 30

8 | Plant metabolism | 6,7

9 | Flower, Fruits and Seeds | 19, 20

9 | Sexual reproduction and Genetics | 8
Sexual reproduction and modes of cross fertilization. Lower plants and higher plants. Meiosis and...
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LABORATORY SYLLABUS

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<th>Laboratory topics</th>
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<tbody>
<tr>
<td>1</td>
<td>The scientific method applied, plan and start life plant experiment system. Germinate seeds to grow under the effect of high and low N.</td>
</tr>
<tr>
<td>2</td>
<td>Plant taxonomy and classification- lab exercise with collected leaf samples and tree classification in the park with a taxonomic key.</td>
</tr>
<tr>
<td>3</td>
<td>Molecular composition of plants and plant products- identification by testing plant samples for terpenes, phenolics and alkaloids.</td>
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<tr>
<td>4</td>
<td>Plant cells, the wide diversity- comparison of live material and prepared microscope slides.</td>
</tr>
<tr>
<td>5</td>
<td>Plant tissues. Ground tissues, vascular tissues and dermal tissues- comparison of live materials and prepared microscope slides.</td>
</tr>
<tr>
<td>7</td>
<td>Leaves and stems. Diversity and relationship between structure and function- comparison of live materials and prepared microscope slides.</td>
</tr>
<tr>
<td>8</td>
<td>Photosynthesis and respiration using an IRGA (infrared gas analyzer), effects of light, temperature and treatment from Lab1. Short time light and temperature treatments in the equipment done on control plants from Lab 1 and other potted plants. Light and CO₂ response curves.</td>
</tr>
<tr>
<td>9</td>
<td>Water and nutrient transport in plants, life experiment with celery.</td>
</tr>
<tr>
<td>10</td>
<td>Reproductive structures of higher plants: flower and fruits, set up germination experiment to observe development from seed in mono- and dicotyledonous plants.</td>
</tr>
</tbody>
</table>
| 12   | Growth and development  
| 13   | Plant breeding and propagation  
Seed propagation and development. Asexual reproduction. Tissue culture and cloning. Seed dependence on vernalization, scarification, smoke and fire. |
| 14   | Evolution of plants  
From lower to higher plants. Bryophytes (mosses), seedless vascular plants (ferns), gymnosperms (cone bearing plants), angiosperms (flowering plants) |
| 15   | Plants in our lives  
Stimulating beverages. Medicinal plants, herbs and spices, psychoactive plants and poisonous plants |
| 16   | Final week |

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12 Plants in our lives I: Forensic botany. Collection and identification of pollen and other plant material for forensic use, other forensic techniques applied.
13 Plants in our lives II: Medicinal plants. Observe, smell and extract essential oils from medicinal plants. Relate observation with active ingredient.
14 Plant Adaptations to different environments - Field trip to Brooklyn Botanical Garden
15 Finals week