

This syllabus is provided as a general informational guide. Some of the information may vary depending on the specific course section and instructor. Different sections of the same course may require different textbooks. Verify the section specific textbook information in the CUNY's Academic Course Schedule Web Page. Modifications of the grading system presented here will be communicated by the instructors of the sections when they meet the class.

BOROUGH OF MANHATTAN COMMUNITY COLLEGE

The City University of New York

Department of Science

General Biology – BIO 109

Lecture hours : 1

Spring 2019

Class hours total : 3

Laboratory hours : 2

Credits : 3

Instructor Information (Phone#, Office#, email) _____

LIFE AND PHYSICAL SCIENCES BUCKET

Course Description

General Biology presents an overview of many important topics in the natural sciences today and provides relevant background material from the physical sciences. It traces life from its beginning (cells) to the development of multi-cellular organisms. It covers topics such as taxonomy, the cell, macromolecules, photosynthesis, inheritance, molecular genetics, and body systems. This class includes a 1 hour lecture and a 2 hour lab session. The lecture hour will be an expansion of the lecture content covered in the co-requisite class BIO 108 - information needed to carry out experiments in the 2 hour hands-on laboratory experience.

Basic Skills MATH 051; ENG 088; ACR 094

Prerequisites/ Co-requisites BIO 108

Course Student Learning Outcomes	Measurements
1. Students will be able to understand metric measurements related to length, volume, weight and temperature including units used to measure cells and their parts.	1. Graded problems involving calculations using the metric system and quiz/ examination based on a laboratory exercise using appropriate tools/instruments to measure length, volume, weight and temperature; quiz/examination.
2. Students will be able to understand and analyze osmotic relationships with regard to artificial and natural selectively permeable membranes.	2. A graded assignment reporting and analyzing the experimental as well as hypothetical results of a laboratory experiment including graphing; quiz/ examination.
3. Students will be able to understand the structure and functions of different kinds of cells.	3. Graded lab exercise; quiz/ examination
4. Students will be able to understand the basis and mechanisms of inheritance.	4. Graded mitosis, meiosis and genetics problems; quiz/ examination.

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Below are the college's general education learning outcomes, the outcomes that are checked in the left-hand column indicate goals that will be covered and assessed in this course. (Check at least one.)

	General Education Learning Outcomes	Measurements (means of assessment for general education goals listed in first column)
	Communication Skills- Students will be able to write, read, listen and speak critically and effectively.	
	Quantitative Reasoning- Students will be able to use quantitative skills and the concepts and methods of mathematics to solve problems.	
X	Scientific Reasoning- Students will be able to apply the concepts and methods of the natural sciences.	Students will conduct hypothesis- driven laboratory experiments and report and analyze the results.
	Social and Behavioral Sciences- Students will be able to apply the concepts and methods of the social sciences.	
	Information & Technology Literacy- Students will be able to collect, evaluate and interpret information and effectively use information technologies.	
	Values- Students will be able to make informed choices based on an understanding of personal values, human diversity, multicultural awareness and social responsibility.	

Below are Pathways Learning Outcomes

Student Learning Outcomes	Assignments and activities
1. Identify and apply the fundamental concepts and methods of a life or physical science.	Students will develop an understanding of basic concepts in biology such as taxonomy, cell structure and function, cell division (mitosis and meiosis), photosynthesis, DNA and heredity. Students will learn about the scientific method and will apply it in laboratory exercises that include measurements of various kinds, microscopy, biochemical analyses and dissections (fetal pig).
2. Apply the scientific method to explore natural phenomena, including hypothesis development, observation, experimentation, measurement, data analysis, and data presentation.	These laboratory investigations are designed to explore phenomena essential to living systems, such as diffusion and osmosis, cell division and photosynthesis. They will be done using both model systems and living cells and tissues.

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	<p>Students will learn to apply the scientific method by performing experiments that will allow them to develop skills in designing hypotheses, in observation and in gathering and analyzing data. They will present their data in lab reports. Results will be presented in a variety of ways, including tables, figures and different types of graphs.</p>
<p>3. Use the tools of a scientific discipline to carry out collaborative laboratory investigations.</p>	<p>Students will work in teams of two or four on each laboratory investigation. Examples of group work include problem solving when covering Mendelian genetics, working together on biochemical analyses and analyzing data collaboratively. They will present their findings in lab reports (see LO#4). Students will use tools such as microscopes, balances, models, histology slides, live animals and dissecting instruments to carry out their investigations</p>
<p>4. Gather, analyze, and interpret data and present it in an effective written laboratory or fieldwork report.</p>	<p>Students will write lab reports on various investigations (for example simple diffusion and osmosis, photosynthesis), describing and analyzing their data. These reports will follow standard scientific report format, including abstract, introduction, materials and methods, results, discussion and conclusions. The results section will include appropriate means of presentation as described above (LO#2). The importance of unbiased data presentation will be stressed in labs, particularly those in which students gather data (LO#5).</p>
<p>5. Identify and apply research ethics and unbiased assessment in gathering and reporting scientific data.</p>	<p>Students will be taught about ethical issues in science research, and the importance of accurate data gathering and reporting in science will be discussed throughout the course. Students will be taught to make unbiased observations and to record their data accurately and effectively. They will be expected to demonstrate a thorough understanding of ethics in science research.</p>

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Required Laboratory Manual Robbins, Mazur & Mata: General Biology Laboratory Manual, 2017; Bluedoor 5th Edition revised ISBN 978-1-68135-435-4. **\$29.35** at the Bookstore

Other Resources

Use of Technology : Blackboard

Evaluation & Requirements of Students

1. Objective & essay examinations including a final examination.
2. Various types of writing assignments and/or oral presentations.
3. Evaluation of laboratory performance through testing / laboratory reports / homework assignments/ practicums.
4. Attendance according to school policy.

Grading and assessment

Student assessment will be comprised of the following:

- a. Exams/quizzes
- b. Lab reports
- c. Homework assignments

LABORATORY ASSIGNMENTS, REQUIREMENTS & EXPECTATIONS

Laboratory Reports

The instructor will assign specific laboratory reports. Guidelines for writing lab reports will be found in exercise 4 of the Laboratory Manual on page 38 and will be discussed by the individual instructor as well.

Homework including graphs found at the end of all the laboratory exercises must be completed and will be collected by the instructor at his / her request.

Students are expected to attend all laboratory sessions.

There is no way of making up a missed Laboratory session.

Instructors are required to take attendance in the laboratory as well as in the lecture classes even if the classes follow one another on the same day.

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The requirements set forth above are the **minimum** requirements for the laboratory portion of this course; individual instructors may add to these requirements.

WEEK	LAB EXERCISE	DESCRIPTION
1	The metric system	Various exercises aimed at teaching students to understand and use the metric system e.g. measuring volume, mass, length using standard lab equipment (LO#3)
2	Taxonomy	Understanding the diversity of life by looking at representative organisms from the different domains (LO#1)
3	The microscope	Examination of various live specimens such as protists (ameba, <i>Paramecium</i> , <i>Euglena</i>) and plant cells (LO#3)
4	Scientific method	Use of the scientific method to study <i>Daphnia</i> . Data collection and lab report (LO#1-5)
5	Properties of organic compounds in cells	Testing for biological compounds (carbohydrates, proteins, lipids, nucleic acids) found in cells using qualitative biological analyses. Data collection and lab report (LO#1-5)
6	Cells	Understanding various cell types (animal, plant, bacteria) by examining living samples and pre-prepared slide. Data collected includes various measurements (size, area, volume) (LO#1, LO#3)
7	Diffusion and osmosis	Examining the effect of isotonic, hypertonic and hypotonic solutions on living cells. Data collection and lab report (LO#1-5)
8	Photosynthesis	Examining how plants create and store energy by the process of photosynthesis. Data collection and lab report (LO#1-5)
9	Cell division - mitosis	Examining the stages of cell division in plants and animals using charts and models (LO#1, LO#3)
10	Sexual reproduction in higher flowering plants and meiosis	Examining the process of meiosis and its outcomes in higher plants using models (LO#1, LO#3)
11	Genetics	Looking at examples of Mendelian genetics and laws of inheritance using Punnett squares (LO#1)
12	Bacteria from our environment	Test the antibiotic properties of spices, herbs and common everyday products on bacteria from our environment (LO#2, LO#3, LO#5)

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13	Dissection: fetal pig	Examining external anatomy and discussion of body systems (muscle, circulatory, reproductive, digestive, nervous, endocrine, integumentary, urinary, respiratory, immune) (LO#1, LO#3)
14	Ecology	Investigate ecosystem, trophic levels and food webs, construct a population growth curve.

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.

College Attendance Policy

At BMCC, the maximum number of absences is limited to one more hour than the number of hours a class meets in one week. For example, you may be enrolled in a three-hour class. In that class, you would be allowed 4 hours of absence (not 4 days). In the case of excessive absences, the instructor has the option to lower the grade or assign an F or WU grade.

BMCC Policy on Plagiarism and Academic Integrity Statement

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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).

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