

CUNY Common Core Course Submission Form

Instructions: All courses submitted for the Common Core must be liberal arts courses. Courses may be submitted for only one area of the Common Core. All courses must be 3 credits/3 hours unless the college is seeking a waiver for a 4-credit Math or Science course (after having secured approval for sufficient 3-credit/3-hour Math and Science courses). All standard governance procedures for course approval remain in place.

College	Kingsborough Community College
Course Number	BIO 13
Course Title	General Biology I
Department(s)	Biological Sciences
Discipline	Biology
Subject Area	Life and Physical Sciences
Credits	4
Contact Hours	6
Pre-requisites	Passing scores on the CUNY/ACT in reading and writing and the COMPASS math skills test
Catalogue Description	The first semester of a one-year, two-semester course for students who plan to major in biological sciences, or prepare for a pre-professional program. Classroom and laboratory sessions focus on biological topics as they apply to all life, to recent scientific findings and how they advance understanding classical concepts, the interaction of environmental and biological forces to produce life.
Syllabus	See pages 7-10 of this document
<p>Waivers for 4-credit Math and Science Courses</p> <p>All Common Core courses must be 3 credits and 3 hours.</p> <p>Waivers for 4-credit courses will only be accepted in the required areas of Mathematical and Quantitative Reasoning and Life and Physical Sciences. Such waivers will only be approved after a sufficient number of 3-credit/3-hour math and science courses are approved for these areas.</p>	
If you would like to request a waiver please check here:	<input checked="" type="checkbox"/> Waiver requested
If waiver requested: Please provide a brief explanation for why the course will be 4 credits.	This is an existing course which forms the foundation of all majors in biological sciences, and which transfers both within and outside CUNY. Four credits, which includes 3 lecture hours plus 3 laboratory hours weekly. Four credits, which represents a widely recognized level of instruction, is standard for first-year introductory biology courses for biology majors, and is necessary for subject mastery.
If waiver requested: Please indicate whether this course will satisfy a major requirement, and if so, which major requirement(s) the course will fulfill.	BIO 13 is a required course for the following degree programs: A.S. Biology (all concentrations), A.S. Biotechnology, and A.S. Science for Forensics

Indicate the status of this course being nominated:

current course revision of current course a new course being proposed

CUNY COMMON CORE Location

Please check below the area of the Common Core for which the course is being submitted. (Select only one.)

Required

- English Composition
- Mathematical and Quantitative Reasoning
- Life and Physical Sciences

Flexible

- World Cultures and Global Issues
- US Experience in its Diversity
- Creative Expression
- Individual and Society
- Scientific World

Learning Outcomes

In the left column explain the assignments and course attributes that will address the learning outcomes in the right column.

I. Required Core (12 credits)

A. English Composition: Six credits

A course in this area must meet all the learning outcomes in the right column. A student will:

- Read and listen critically and analytically, including identifying an argument's major assumptions and assertions and evaluating its supporting evidence.
- Write clearly and coherently in varied, academic formats (such as formal essays, research papers, and reports) using standard English and appropriate technology to critique and improve one's own and others' texts.
- Demonstrate research skills using appropriate technology, including gathering, evaluating, and synthesizing primary and secondary sources.
- Support a thesis with well-reasoned arguments, and communicate persuasively across a variety of contexts, purposes, audiences, and media.
- Formulate original ideas and relate them to the ideas of others by employing the conventions of ethical attribution and citation.

B. Mathematical and Quantitative Reasoning: Three credits

A course in this area must meet all the learning outcomes in the right column. A student will:

- Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.
- Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.
- Represent quantitative problems expressed in natural language in a suitable mathematical format.
- Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.
- Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.
- Apply mathematical methods to problems in other fields of study.

C. Life and Physical Sciences: Three credits	
A course in this area <u>must meet all the learning outcomes</u> in the right column. A student will:	
Students demonstrate the following in written and practical exams: understanding of the scientific method; the classification of organisms (taxonomy); cellular structure and function; basic biochemistry; metabolic processes including protein synthesis, enzyme action, cellular respiration, and photosynthesis; and genetics.	<ul style="list-style-type: none"> Identify and apply the fundamental concepts and methods of a life or physical science.
Students undertake a laboratory-based, experimental inquiry in which they design an experiment to answer a specific question, form hypotheses, collect and analyze data, and write a formal scientific report. In addition, ten of the twelve laboratory sessions include hypothesis formation and testing.	<ul style="list-style-type: none"> Apply the scientific method to explore natural phenomena, including hypothesis development, observation, experimentation, measurement, data analysis, and data presentation.
All twelve laboratory sessions involve students working in groups to learn techniques and use tools, including compound and dissection microscopy; use of basic lab equipment such as balances, pH meters, pipettes, graduated cylinders, etc.; the PASCO computer interface for data collection, chromatography, enzyme assays, and distillation.	<ul style="list-style-type: none"> Use the tools of a scientific discipline to carry out collaborative laboratory investigations.
Students are required to prepare at least one formal written scientific lab report, which includes presentation of hypothesis, observations, experimental design, methods, results (including appropriate graphs), data analysis, and conclusions. Other lab reports that include at least one or more of these components are included in each laboratory session. Use of descriptive statistics and the chi-square test are also required.	<ul style="list-style-type: none"> Gather, analyze, and interpret data and present it in an effective written laboratory or fieldwork report.
During week 1 in lecture and lab, students learn research ethics, how to avoid bias in experimental design and data gathering, and how to appropriately interpret data. These concepts are applied throughout the semester in classroom discussions and laboratory experiments, and must be properly observed in each experiment and laboratory report. In week 11 (biotechnology, genetic engineering) students discuss ethics in the application of biological concepts and techniques.	<ul style="list-style-type: none"> Identify and apply research ethics and unbiased assessment in gathering and reporting scientific data.
II. Flexible Core (18 credits)	
Six three-credit liberal arts and sciences courses, with at least one course from each of the following five areas and no more than two courses in any discipline or interdisciplinary field.	
A. World Cultures and Global Issues	
A Flexible Core course <u>must meet the three learning outcomes</u> in the right column.	
	<ul style="list-style-type: none"> Gather, interpret, and assess information from a variety of sources and points of view.
	<ul style="list-style-type: none"> Evaluate evidence and arguments critically or analytically.
	<ul style="list-style-type: none"> Produce well-reasoned written or oral arguments using evidence to support conclusions.
A course in this area (II.A) <u>must meet at least three of the additional learning outcomes</u> in the right column. A student will:	
	<ul style="list-style-type: none"> Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring world cultures or global issues, including, but not limited to, anthropology, communications, cultural studies, economics, ethnic studies, foreign languages (building upon previous language acquisition), geography, history, political science, sociology, and world literature.
	<ul style="list-style-type: none"> Analyze culture, globalization, or global cultural diversity, and describe an event or process from more than one point of view.
	<ul style="list-style-type: none"> Analyze the historical development of one or more non-U.S. societies.
	<ul style="list-style-type: none"> Analyze the significance of one or more major movements that have shaped the

	world's societies.
	<ul style="list-style-type: none">• Analyze and discuss the role that race, ethnicity, class, gender, language, sexual orientation, belief, or other forms of social differentiation play in world cultures or societies.
	<ul style="list-style-type: none">• Speak, read, and write a language other than English, and use that language to respond to cultures other than one's own.

B. U.S. Experience in its Diversity

A Flexible Core course must meet the three learning outcomes in the right column.

- Gather, interpret, and assess information from a variety of sources and points of view.
- Evaluate evidence and arguments critically or analytically.
- Produce well-reasoned written or oral arguments using evidence to support conclusions.

A course in this area (II.B) must meet at least three of the additional learning outcomes in the right column. A student will:

- Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the U.S. experience in its diversity, including, but not limited to, anthropology, communications, cultural studies, economics, history, political science, psychology, public affairs, sociology, and U.S. literature.
- Analyze and explain one or more major themes of U.S. history from more than one informed perspective.
- Evaluate how indigenous populations, slavery, or immigration have shaped the development of the United States.
- Explain and evaluate the role of the United States in international relations.
- Identify and differentiate among the legislative, judicial, and executive branches of government and analyze their influence on the development of U.S. democracy.
- Analyze and discuss common institutions or patterns of life in contemporary U.S. society and how they influence, or are influenced by, race, ethnicity, class, gender, sexual orientation, belief, or other forms of social differentiation.

C. Creative Expression

A Flexible Core course must meet the three learning outcomes in the right column.

- Gather, interpret, and assess information from a variety of sources and points of view.
- Evaluate evidence and arguments critically or analytically.
- Produce well-reasoned written or oral arguments using evidence to support conclusions.

A course in this area (II.C) must meet at least three of the additional learning outcomes in the right column. A student will:

- Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring creative expression, including, but not limited to, arts, communications, creative writing, media arts, music, and theater.
- Analyze how arts from diverse cultures of the past serve as a foundation for those of the present, and describe the significance of works of art in the societies that created them.
- Articulate how meaning is created in the arts or communications and how experience is interpreted and conveyed.
- Demonstrate knowledge of the skills involved in the creative process.
- Use appropriate technologies to conduct research and to communicate.

D. Individual and Society

A Flexible Core course must meet the three learning outcomes in the right column.

- | | |
|--|---|
| | <ul style="list-style-type: none">● Gather, interpret, and assess information from a variety of sources and points of view. |
| | <ul style="list-style-type: none">● Evaluate evidence and arguments critically or analytically. |
| | <ul style="list-style-type: none">● Produce well-reasoned written or oral arguments using evidence to support conclusions. |

A course in this area (II.D) must meet at least three of the additional learning outcomes in the right column. A student will:

- | | |
|--|---|
| | <ul style="list-style-type: none">● Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the relationship between the individual and society, including, but not limited to, anthropology, communications, cultural studies, history, journalism, philosophy, political science, psychology, public affairs, religion, and sociology. |
| | <ul style="list-style-type: none">● Examine how an individual's place in society affects experiences, values, or choices. |
| | <ul style="list-style-type: none">● Articulate and assess ethical views and their underlying premises. |
| | <ul style="list-style-type: none">● Articulate ethical uses of data and other information resources to respond to problems and questions. |
| | <ul style="list-style-type: none">● Identify and engage with local, national, or global trends or ideologies, and analyze their impact on individual or collective decision-making. |

E. Scientific World

A Flexible Core course must meet the three learning outcomes in the right column.

- | | |
|--|---|
| | <ul style="list-style-type: none">● Gather, interpret, and assess information from a variety of sources and points of view. |
| | <ul style="list-style-type: none">● Evaluate evidence and arguments critically or analytically. |
| | <ul style="list-style-type: none">● Produce well-reasoned written or oral arguments using evidence to support conclusions. |

A course in this area (II.E) must meet at least three of the additional learning outcomes in the right column. A student will:

- | | |
|--|--|
| | <ul style="list-style-type: none">● Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies. |
| | <ul style="list-style-type: none">● Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions. |
| | <ul style="list-style-type: none">● Articulate and evaluate the empirical evidence supporting a scientific or formal theory. |
| | <ul style="list-style-type: none">● Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities. |
| | <ul style="list-style-type: none">● Understand the scientific principles underlying matters of policy or public concern in which science plays a role. |

KINGSBOROUGH COMMUNITY COLLEGE
CITY UNIVERSITY OF NEW YORK
DEPARTMENT OF BIOLOGICAL SCIENCES

BIOLOGY 13: GENERAL BIOLOGY I
Syllabus

Biology 13 is a 4 credit, 6 hour course, with a laboratory component, open to students who have passing scores on the CUNY Reading, Writing and Mathematics FSA tests or the equivalent.

The first semester of the General Biology course will be graded as follows:

50% Lecture, 20% of which will be the final examination, and

50% Laboratory

Additional details regarding examinations, assignments, *etc.* will be provided by your lecture instructor; details regarding quizzes, papers, other assignments, *etc.* will be provided by your laboratory instructor.

The required textbooks for this course are:

Lecture:

BIOLOGY Eighth Edition (2008)

By Neil A. Campbell and Jane B. Reece.

Benjamin Cummings Publishing Co. New York.

Laboratory:

GENERAL BIOLOGY I - LABORATORY EXERCISES (5th Edition 2009)

C. Beeber, C. Biermann, C. Hinkley, M. Lakrim, P. Lanzetta, G. Lind,

T. Markus, M. Ortiz, P. Pilchman, K. Polizzotto, A. Stavroulakis.

McGraw-Hill Custom

(If Requested by Instructor) A PHOTOGRAPHIC ATLAS FOR THE BIOLOGY LABORATORY (5TH or 6TH ED) K. M. Van De Graaff and J. L. Crawley,

Morton Publishing Company, Englewood, CO

Recommendations to the Student:

- Textbook pages as well as laboratory assignments should be read before class.
- Observe all safety precautions as instructed in the laboratory. They are for your protection.

- Each student is responsible for the proper and safe maintenance of their laboratory work area. Bench tops and microscopes must be properly cleaned before and after use.

- Laboratory coats must be worn at all times during classes in the laboratory. Open-toed shoes are not allowed in the laboratory. Each student must purchase goggles and non-latex gloves. These will be required for some laboratory exercises, as specified by your instructor.

Plagiarism as a violation of academic integrity

Students will be asked to write papers and laboratory assignments. During this endeavor they should be careful to avoid plagiarism. Plagiarism is the intentional theft(s) of someone else's intellectual property without attribution (proper credit). Determination and penalty – ranging from grade reduction to course failure -- will be decided by the instructor.

Lecture Outline

Week 1: The Scientific Method

The Characteristics of Life

Chapter 1 p. 1 –10; p. 19-25

Weeks 2-4: Basic Chemistry: Water & Carbon

Biological Chemistry: Carbohydrates, Lipids, Proteins, & Nucleic Acids

The Cell : A Tour of the Fundamental Unit of Life

Prokaryotes and Eukaryotes

Maintaining Homeostasis and the Cell Perimeter.

The Plasma Membrane, Import and Export.

Chapter 2 p. 32-44; Chapter 3 p. 47-55; Chapter 4 p. 58 – 65; Chapter 5 p. 68 - 89

Chapter 6 p. 94 – 120; Chapter 7 p. 124 - 138

Weeks 5-7.5: The Rules for Handling Chemicals and Energy: Metabolism, Thermodynamics &

Enzymology

The Cell as a Producing Factory

Photosynthesis

The Cell is a Processing Factory

ATP, Cellular Respiration

Chapter 8 p. 141 – 157; Chapter 10 p. 181 – 198; Chapter 9 p. 160 - 178

Weeks 7.5-11: Cell Division: The Cell Cycle and Mitosis

Classical Mendelian Genetics

Observable Patterns of Inheritance. Meiosis

The Chromosomal Basis of Inheritance

Meiosis Errors and Exceptions

The Molecular Basis of Cellular Inheritance: DNA

Gene Expression: Transcription, Translation and Protein Synthesis.

Organization and Control of Eukaryotic Genomes

Genetic Engineering

Chapter 12 p. 218 – 233; Chapter 14 p. 251 – 270; Chapter 13 p.238 – 249;

Chapter 15 p. 274-290; Chapter 16 p. 293 – 308; Chapter 17 p. 309 – 330;

Chapter 19 p. 359 – 380; Chapter 20 p. 384 – 408

Week 12: Exploring Life on its Many Levels

Evolution, Unity and Diversity

Systematics and Taxonomy

Chapter 1 p. 10 -18; Chapter 25 p. 491 - 508

LABORATORY OUTLINE

Week 1

Laboratory Safety Rules and Guidelines
Characteristics of Life
Metric Measurement and Equipment
Exercise 1, 1A, 1B

Week 2

Scientific Inquiry Experiment
Exercise 2A, 2B

Week 3

Basic Chemistry
Computer Exercise - Acids, Bases and Buffers
Exercise 3

Week 4

The Compound Microscope I : Basics
Macromolecules
Exercise 4 Part 1 & 2

Week 5

Structure and Function of Living Cells
The Compound Microscope II : Cells
Diffusion, Osmosis and the Functional Significance
of Biological Membranes.
Exercise 5A, 5B

Week 6

Enzymology
Exercise 6

Week 7

Photosynthesis
Fluorescence
Exercise 7

Week 8

Cellular Respiration
Exercise 8

Week 9

Chromosomes and Cell Division
Mitosis and Meiosis
Exercise 9

Week 10

Heredity: Classic Genetics
The Dissection Microscope
The Fruit Fly

Molecular Genetics – Drosophila Eye Pigments
Exercise 10

Week 11

Molecular Biology: Forensics
How Genetics is Done: Dihybrid Cross in Corn
The Chi Square Test
Exercise 11

Week 12

Biodiversity
Exercise 12

During the course of the semester, you will also participate in up to three assessment exercises. These are not graded tests, but attempts to see how well you have mastered the techniques of biology. Further information will be provided by your instructor.