# BIOLOGY 100: Biological Principles + Lab
## (4 credits)
## Quito, Ecuador

## COURSE DESCRIPTION:

This course is a general education science accredited class (4 credits). It is an introductory course designed to provide a broad survey of biological principles and is primarily designed to provide meaningful and adequate exposure to biology for the non-science major. It will also help to prepare students for further study in the biological sciences. Because Ecuador is rich in biodiversity, it is an ideal place to survey biological principles. These principles will include the nature of science, discussion of origins, ecology, cell biology, genetics, zoology and human anatomy, as well as an overview of their effects on daily life. While there is no laboratory class required for this course, a hands-on lab component and field experience will be included.

## COURSE OBJECTIVES:

### Student Learning Objectives

**IDEA Objective #1**: Gaining factual knowledge (terminology, classifications, methods, trends) (Essential). The learner will demonstrate that he or she has satisfactorily fulfilled IDEA Objective #1 by being able to:

- Recognize the structures of the cell and their function
- Match terrestrial ecological communities with their biotic and abiotic features
- Identify human anatomical features such as bones, muscles, and organs
- Explain the function of human anatomical features

**IDEA Objective #2**: Learning fundamental principles, generalizations, or theories (Important). The learner will demonstrate that he or she has satisfactorily fulfilled IDEA Objective #2 by being able to:

- Describe how organisms are classified and recognize the groups to which they belong
- Explain the interaction of organisms at the population, community, and ecosystem level
- Understand the function of human organs and organ systems in maintaining health

**IDEA Objective #3**: Learning to apply course material (to improve thinking, problem solving, and decisions) (Important). The learner will demonstrate that he or she has satisfactorily fulfilled IDEA Objective #3 by being able to:

- Utilize course material in making medical or social decisions

- Evaluate the various theories on the origin of life

**IDEA Objective #11**: Learning how to analyze and critically evaluate ideas, arguments, and points of view (Important). The learner will demonstrate that he or she has satisfactorily fulfilled IDEA Objective #11 by being able to:

- Recognize the point of view of the authors of the textbook
- Evaluate the relative strengths of arguments for different perspectives on origins

## REQUIRED TEXTS:

Mader & Windelspecht, 14th Edition (2014). ISBN 978-0-07-352552-5

## COURSE EXPECTATIONS:

- _____:
  Engagement and participation are essential to learning in any environment. Active course participation is therefore considered mandatory. Thus students must arrive ON TIME and attend each class session. If there is a valid emergency for missing a class or arriving late, please contact the professor by phone or e-mail with as much advanced notice as possible (see contact information on page 1). Absences, tardiness, and participation will impact the final grade (see grading information). Good preparation on the part of all members of the class will enhance the learning experience for everyone. Any student who misses 50% of the course sessions will not receive credit for the course.

- _____
  Class hours will be focused on the class content and the community within the classroom. All cell phone use, social networking, and e-mailing should be avoided. Cell phones should be turned off in consideration of others. Failure to do so will impact the grade. Students may use laptop computers to take notes as long as the computer is used solely for class purposes.

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  1. All written assignments should be typed in 12-point Times New Roman, double-spaced, in APA format, with 1-inch margins, with properly formatted citations and a References/Works Cited page.
  2. Whether students quote or paraphrase the ideas, concepts, or words of another author, they are required to give credit to the author by citing the source (in-text & in works cited page). Wikipedia may be used as one source, but should be cited from the references given at the end of the document.
  3. All written assignments will have a length specified in the assignment description. Points will be deducted for assignments that do not meet the specified length – unless a range has been provided, and the specified length is both a minimum and a maximum in striving for clear and concise writing. References/Works Cited pages do not count towards the word or page length of a written assignment.
  4. Written assignments are expected to have few, if any, grammatical, punctuation or spelling errors. Points will be deducted for such errors.
  5. Avoid long quotes and seek to put information into your own words.

6. Any work that is plagiarized will be given a failing grade. For a clearer understanding of the types of plagiarism and how to avoid it, see: http://www.plagiarism.org/

- Course assignments (e.g., homework, projects) will generally not be accepted late. Late work, when accepted, will not be awarded full credit.

- **The syllabus is a guideline, not a contract, and is subject to change at the instructor's discretion as circumstances warrant. Changes will be communicated via email, canvas and/or in-class. Check canvas for the most up-to-date deadlines.**

- Evaluation of your work is based on many factors. These include but are not limited to: participation, written assignments, and examinations. A "C" grade indicates adequate performance, a "B" grade indicates good, competent and complete work, and an "A" grade indicates creative excellence that is integrative and exceeds requirements.

## GRADING SCALE:

| Letter Grade | Numerical Equivalent |
|---|---|
| A | 93 - 100 |
| A- | 90 - 92 |
| B+ | 88 - 89 |
| B | 83 - 87 |
| B- | 80 - 82 |
| C+ | 78 - 79 |
| C | 73 - 77 |
| C- | 70 - 72 |
| D+ | 68 - 69 |
| D | 65 - 67 |

## COURSE REQUIREMENTS & GRADING:

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|---|---|
| Attendance & Participation: (Includes reading and online activity) | 150 points |
| Assessments: | |
| Lab Reports | 275 points |
| Unit Tests (2) | 200 points |
| Project | 50 points |
| Vocabulary Quizzes | 50 points |
| Final exam | 275 points |
| | Total: 1000 points |

## COURSE OUTLINE:

| CLASS | TOPICS | Assessments & Assignments / Laboratory Objectives |
|---|---|---|
| **Class #1** | **Nature of Science: Introduction** (Chapter 1, pp. 1-15) | Read and sign syllabus<br>Coca-Cola Lab Part 1<br>NSTA, Biologos, AiG Reading response due Sep 16 |
| **Lab #1** | **Introduction to Probability and Statistics in Science** | Students will be able to analyze a scientific journal article and understand how statistics are used to reject or support a null hypothesis.<br>Coca-Cola Lab Part 2 |
| **Class #2** | **Molecules** (Chapter 2, pp. 19-40) | Vocab Quiz #1<br>Radioactive Dating online simulation/handout |
| **Lab #2** | **Macromolecules and Energy Sources** | Macromolecule testing: Students will be able to perform qualitative chemical tests for lipids, proteins, simple sugars, and starch in food samples. |
| | | Rucu Hike<br>Begin the Bohr Effect Laboratory |
| **Class #3** | **Cell Structure** (Ch. 3-4, pp. 44-76)<br>**Cell Division** (Ch. 5, pp. 79-96) | Macromolecules Lab Report due<br><br>Vocab Quiz #2 |
| **Lab #3** | **Cell Structure and Cell Division** | Microscope: Students will learn to perform a wet mount with basic staining techniques, and to |

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| | | identify important cell structures and mitotic phases. |
| **Class #4** | **Ecology**<br>(Ch. 34-36, pp 688-728) | Cell Lab Report due<br>Annenberg Learner online simulation ?<br>Vocab Quiz #3 - canvas |
| **Lab #4** | **Ecology** | Plant Specimen Identification: Students will experience, identify, and draw plants native to Ecuador in a wide variety of ecological communities.<br>Botanical Gardens Visit |
| | | Jungle trip<br>Jungle trip: Insect and plant photo collection |
| **Class #5** | **Ecology and Plant Communities**<br>**Plant Taxonomy** | Plant ecosystem follow-up<br>Review exam |
| **Lab #5** | **Test 1: In Class** | Insect and plant photo collection due |
| **Class #6** | **Genetics & Inheritance**<br>(Ch. 23-24, pp. 462-485) | |
| **Lab #7** | **Genetics & Inheritance** | Plant ID lab due<br>DNA Sequencing and Huntington's Disease Ethics Module: Students will role-play different family members in a genetic counseling scenario for the pre-symptomatic testing for Huntington's disease. |
| **Class #8** | **DNA**<br>(Ch. 25, pp. 495-514)<br>Ethics and Technology<br>**Nature vs. Nurture**<br>(Ch. 33, pp 671-687) | Project: Genetics Presentation assigned<br><br>Vocab Quiz #4 |
| **Lab #8** | | **Genetics projects presentations** |
| **Class #9** | **Perspectives in Origins, Evolution and Diversity**<br>(Ch. 27, pp 533-558) | "From the dust" videos and response |

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| **Lab #9** | **Evolution and Anatomy** | "Herbivore, Omnivore, Carnivore?": Students will be able to correlate data from dentition in different animal skulls to behavioral and dietary characteristics. |
| **Class #10** | **Human Anatomy and Physiology: Body Systems**<br>(Ch. 11, 12, 14, 15-19<br>pp. 189-224; 252-384) | Vocab Quiz #5<br>**Take Home Test #2 Due Wednesday** |
| **Lab #10** | **Human Physiology** | Skulls and skeletons Lab report due<br>Body systems Lab: Explore some basics of each body system<br>The Bohr Effect: Students will travel to high altitudes and record partial gas pressures and physiological data to ascertain the effects on four major organ systems: the cardiovascular, respiratory, digestive, and urinary systems.<br>The Special Senses and Reflexes: Students will identify the structure and function of the cranial and spinal nerves through a series of reflex tests. |
| **Class #11** | **Invertebrates**<br>(Ch. 31, pp. 622-648)<br>**Vertebrates**<br>(Ch. 32, pp. 650-661) | Vivarium visit and assignment? |
| **Lab #11** | **Vertebrates** | Body systems lab report due<br>Fresh Specimen Dissection: Students will examine the differences in body structure and circulation of crayfish, trout, cow hearts, and rabbits. |
| **Class #12** | **Review** | Review Sheet for Final Exam<br>Darwin's Finches: Students will be able to link speciation with genetic variation and identify Darwin's finches, giant tortoise, and varieties of marine iguanas in their unique ecological niches. |
| **Class #13** | **Final Exam** | Dissection lab report due |
| **Lab #12-13** | **Lab "Final": Galápagos** | Galápagos Islands trip<br>Response: 'Disappearing Iguanas' article<br>Project: Photo collection and identification |

Assignment and Points Breakdown:

| Attendance & Participation | Labs | Projects, Quizzes, Tests |
|---|---|---|
| Signed Syllabus ( /10) | Coca-Cola and the Scientific Method ( /25) | Vocab Quiz #1 ( /10) |
| Process of Science Responses ( /20) | Macromolecules ( /25) | Vocab Quiz #2 ( /10) |
| Origins Video Responses ( /20) | Cell Staining and Identification ( /25) | Vocab Quiz #3 ( /10) |
| Macromolecules booklet ( /20) | Jungle: Insect and Plant Collection ( /25) | Vocab Quiz #4 ( /10) |
| Radioactive Dating online ( /15) | Ethics module ( /25) | Vocab Quiz #5 ( /10) |
| Annenberg Learner online ( /20) | Skulls and Skeletons ( /25) | Unit Test #1 ( /100) |
| Gardens visit ( /10) | High Altitude ( /25) | Unit Test #2 ( /100) |
| Vivarium visit ( /10) | Special Senses ( /25) | Genetics Project ( /50) |
| Teleférico visit ( /10) | Dissection ( /25) | |
| Physiology Chapters Reading Outlines ( /15) | Galápagos ( /50) | Final Exam ( /275) |
| TOTAL: ( /150) | TOTAL: ( /275) | TOTAL: ( /575) |

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## Statement of Good Faith:

I have read and understand the goals, objectives, and grading policies outlined in the syllabus. I agree to abide by them. I understand that the syllabus is subject to change at the instructor's discretion.

Printed Name:_____ Signed: _____ Date: _____