

BIOL 102 – Biology and Society 01 (Online Only)

Course Syllabus: Spring 2021

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| Instructor: | Lisa L. Harmon |
| Email: | lisah@uidaho.edu |
| Office & Phone: | LSS 265 & 885-6185 |
| Office Hours: | MW 8:30-9:20am In-person LSS 265/Zoom Drop-in or by appointment |
| Lectures: | Online Only |
| Textbooks: | <u>Concepts of Biology, 2016 (free online at http://openstaxcollege.org) OR Campbell Essential Biology with Physiology, 6th ed., 2019. Simon, Dickey & Reece</u> |

Course Description:

There has never been a better day to start learning biology. Being a living thing, you interact with the natural world each day. BIO 102 takes the most important content of biology organizing it into five core areas: ecology; cells; genetics; evolution; and animal systems. The goals of the course are to create a better understanding of the living world, relate the core content to students' lives, clarify the process of science and demonstrate how evolution is the overarching theme of biology. Students will start with the big picture by studying ecological systems. Students will then dive into the smallest unit of life, the cell, and explore cellular structures, functions and processes. In the third unit, students will study DNA, inheritance patterns and how genetics impacts their lives. In the fourth unit, students will explore the evolutionary processes that shape the living world. The final unit describes the interface between form and function in our own human bodies. Through these five units, it is my hope that you will make important connections between biology and how it applies to your own life. Biology 102 is a part of the University of Idaho General Education curriculum that emphasizes a multi-year, broad liberal education. This course will discuss environmental issues, genetics, evolution and human health topics that will be integrated into other courses you take here.

Class Notes and Other Course Information:

All class information can be found on the class site on Bb LEARN <https://www.bblearn.uidaho.edu>. You will be prompted to enter your username (vand1234) and password (same as your email account) to access course materials. Lecture notes with study sheets will be posted as guides. All quizzes and exams will occur on Bb Learn throughout the semester.

Grading:

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| • 5 Lecture Exams (90 pts each) | 450 |
| • 10 Quizzes (10 pts each; 5 for a grade & 5 extra credit) | 50 (50 extra credit) |

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| TOTAL= | 500 points |
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Calculating Your Grade:

Letter grades are awarded based on the University of Idaho grade scale:

A 90 – 100%: B 80 – 89.9%: C 70 – 79.9%: D 60 – 69.9%: F 0 – 59.9%

Grades will be updated frequently on the “My Grades” section of blackboard. Early Warning Grades (D’s & F’s) will be entered into the VandalStar program and an advisor will contact you within the first few weeks of classes. Midterm and Final Grades will be entered into the VandalWeb program.

Quizzes & Exams:

Ten quizzes and five unit exams will consist of a combination of matching and multiple-choice questions. Study sheets for each unit have been provided to guide students to the important information. All quizzes and exams will be open-note so having these study sheets completed will help you do well on the assessments of the class. **Quizzes will be 10 questions and have a time limit of 15 minutes. Exams will be 45 questions and have a time limit of 60 minutes. All quizzes and exams must be completed by 11:59pm on the day they are due!**

Absence from Quizzes or Exams:

All quizzes and exams will be taken online through Bb Learn. A window will be given to access the test and students will be allowed only a certain time period to complete the assessment. There should be no reason to miss these quizzes or exams! If you miss a quiz or an exam, you will receive zero points for that assignment. If there is any reason for missing a quiz or an exam, please notify me before the test occurs or as soon as possible. In order to schedule a make-up quiz or exam, you will need to provide the instructor with a doctor's note or university letter documenting the reason for missing the assessment. This document must cover the entire testing window to be valid. **If you have any grading concerns, please schedule an appointment or email me to set up a meeting within one week of the due date of the assignment.**

Readings and Videos:

Readings are assigned below by chapter in the Concepts and Campbell books (only one textbook is necessary for the course). I have also filmed videos of the lectures that can be viewed using my YouTube playlist (link below). These give more details. Since you are taking this course in the online-only format, it is up to you to view the lectures and videos to complete the study sheets before taking the quizzes and exams. I have placed study sheet question numbers on the lecture slides in the upper right-hand corner to help guide you to the correct information. Please email me with your questions or if you need more help with something!

YouTube Playlist= https://www.youtube.com/playlist?list=PLik0xM-HLzeGr5seS3sxmi_CF7P430DF-

COVID Accommodations:

If you are on campus, please feel free to attend the in-person lectures in LSS 277 on MWF at 10:30am (this is completely optional for online students, but an extra resource if you need it). Please wear a mask while on campus! Make sure to check your UI email account for any announcements or changes in our schedule as classes go forward this spring. **Your UI email account will be the only way I can get information to you if anything changes.**

Center for Disability Access and Resources (CDAR):

Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through CDAR located in the Bruce M. Pitman Center, Suite 127 in order to notify your instructor as soon as possible regarding accommodation(s) needed for the course. Contact CDAR at 208-885-6307, email cdar@uidaho.edu or go to www.uidaho.edu/current-students/cdar.

Academic Dishonesty:

Acts of cheating or plagiarism will not be tolerated. Your exams and quizzes must be your own work. According to university policy cheating or plagiarism can result in you failing this class. The *UI Student Handbook* outlines the expected code of conduct for students at the University of Idaho. Article II addresses academic honesty of students.

Course Outline:

Unit 1: Ecology

| DATE | LECTURE TOPIC | STUDY SHEET | YouTube VIDEO | CAMPBELL TEXT | CONCEPTS TEXT |
|-------------|----------------------------------|--------------------------|------------------------|---------------|---------------|
| 1-13 | SEMESTER OVERVIEW | Unit 1 Study Sheet #1 | Introduction | CHAP 1 | CHAP 1 |
| 1-15 | POPULATION ECOLOGY | Unit 1 Study Sheet #1 | Population Ecology | CHAP 18 & 19 | CHAP 19 |
| 1-17 | Quiz #1 Due | | | | |
| 1-18 | NO CLASS/ UI CLOSED | | | | |
| 1-20 | COMMUNITY ECOLOGY | Unit 1 Study Sheet #2 | Community Ecology | CHAP 20 | CHAP 19 |
| 1-22 | ECOSYSTEM ECOLOGY | Unit 1 Study Sheet #2 | Ecosystem Ecology | CHAP 20 | CHAP 20 |
| 1-24 | Quiz #2 Due | | | | |
| 1-25 | HUMAN IMPACTS | Unit 1 Study Sheet #3 | Human Impacts | CHAP 18-20 | CHAP 21 |
| 1-27 | CONSERVATION SOLUTIONS | Unit 1 Study Sheet #4 | Conservation Solutions | CHAP 18-20 | CHAP 21 |
| 1-29 | REVIEW IN CLASS | | | | |
| 2-1 | NO CLASS/ TAKE EXAM 1 | | | | |

Exam 1= Ecology Exam will be open on 1/29 at noon and will run through 2/1. The exam is 45 questions and you have 60 minutes to complete it. All students must take this exam by 2/1 at 11:59pm!

Unit 1 Learning Outcomes:

- Students will be able to define the scope of biology and list seven characteristics of living things.
- Students will be able to describe a population in terms of its density, age structure, growth and distribution across a given area.
- Students will be able to describe density-dependent and density-independent limiting factors that influence populations and their growth.
- Students will understand how the population of humans has grown over time and the impacts of this growth on other living things.
- Students will be able to describe interactions within a community and how communities change over time.
- Students will be able to draw a food chain, food web or energy pyramid, and answer questions about how energy flows within an ecosystem.
- Students will observe example nutrient cycles and be able to explain how nutrients are recycled within an ecosystem.
- Students will discuss various human impacts that influence the populations, communities and ecosystems around them.
- Students will be able to describe some conservation biology solutions to various environmental problems seen today.

Unit 2: Cells & Processes

| DATE | LECTURE TOPIC | STUDY SHEET | YouTube VIDEO | CAMPBELL TEXT | CONCEPTS TEXT |
|-------------|----------------------------------|--------------------------|--|---------------|---------------|
| 2-3 | BIOCHEM REV & MACROMOLE. | Unit 2 Study Sheet #1 | Chem Review & Macromolecules | CHAP 2-3 | CHAP 2 |
| 2-5 | CELL REVIEW | Unit 2 Study Sheet #2 | Intro to Cells & Cell Structure/Function | CHAP 4 | CHAP 3 |
| 2-7 | Quiz #3 Due | | | | |
| 2-8 | CELL MEMBRANE | Unit 2 Study Sheet #2 | Intro to Cells | CHAP 4 | CHAP 3 |
| 2-10 | MEMBRANE TRANSPORT | Unit 2 Study Sheet #3 | Passive Transport & Active Transport | CHAP 5 | CHAP 3 |
| 2-12 | ENERGY & ENZYMES | Unit 2 Study Sheet #3 | Energy & Enzymes | CHAP 5 | CHAP 4 |
| 2-14 | Quiz #4 Due | | | | |
| 2-15 | NO CLASS/ UI CLOSED | | | | |
| 2-17 | CELLULAR RES. & FERMENT. | Unit 2 Study Sheet #4 | Cellular Respiration & Fermentation | CHAP 6 | CHAP 4 |
| 2-19 | PHOTOSYNTH. | Unit 2 Study Sheet #4 | Photosynthesis | CHAP 7 | CHAP 5 |
| 2-22 | REVIEW IN CLASS | | | | |
| 2-24 | NO CLASS/ TAKE EXAM 2 | | | | |

Exam 2= Cell Exam will be open on 2/22 at noon and will run through 2/24.

The exam is 45 questions and you have 60 minutes to complete it.

All students must take this exam by 2/24 at 11:59pm!

Unit 2 Learning Outcomes:

- Students will understand that organisms are also chemical systems made up of atoms, elements, compounds and macromolecules.
- Students will be able to list the four macromolecules, name at least one important function for each and will be able to describe the chemical reactions that break them down and build them up.
- Students will understand four types of chemical bonds that are frequently found in living things.
- Students will understand the importance of carbon as the backbone of life and the important properties of water that enable life on Earth.
- Students will understand the structure and main functions of the plasma membrane.
- Students will distinguish between passive and active transport, and know how examples of each work to move materials across the plasma membrane.
- Students will compare and contrast prokaryotes versus eukaryotes, and plant versus animal cells.
- Students will list all the cell organelles, describe their functions and state whether they belong to the endomembrane system or not.
- Students will understand the chemical structure of ATP and why it is an important energy molecule for cells.
- Students will be able to describe the composition of enzymes, how they function to speed up chemical reactions and how they can be inhibited.
- Students will know the four steps to cellular respiration, what each reaction does during this process, where the reaction occurs within a cell and how this process generates ATP for work.
- Students will compare and contrast fermentation to cellular respiration.
- Students will be able to list the order of photosynthesis reactions, what each does for a producer and where these reactions occur within the cell.

Unit 3: Genetics

| DATE | LECTURE TOPIC | STUDY SHEET | YouTube VIDEO | CAMPBELL TEXT | CONCEPTS TEXT |
|-------------|---|--------------------------|--|---------------|---------------|
| 2-26 | CHEM OF DNA & RNA | Unit 3 Study Sheet #1 | Chemistry of DNA | CHAP 10 | CHAP 9 |
| 3-1 | DNA REPLICATION | Unit 3 Study Sheet #1 | DNA Replication | CHAP 10 | CHAP 9 |
| 3-3 | MITOSIS & CANCER | Unit 3 Study Sheet #2 | Mitosis & Cancer | CHAP 8 | CHAP 6 |
| 3-5 | MEIOSIS | Unit 3 Study Sheet #2 | Meiosis & Mitosis- Meiosis Compared | CHAP 8 | CHAP 7 |
| 3-7 | Quiz #5 Due | | | | |
| 3-8 | MENDEL | Unit 3 Study Sheet #3 | Mendel | CHAP 9 | CHAP 8 |
| 3-10 | PUNNETTS & PEDIGREES | Unit 3 Study Sheet #3 | Mendel | CHAP 9 | CHAP 8 |
| 3-12 | MENDEL VARIATIONS | Unit 3 Study Sheet #4 | Mendel Variations Part I & Part II | CHAP 9 | CHAP 8 |
| 3-14 | Quiz #6 Due 3/15-19 NO CLASS | | | | |
| 3-22 | PROTEIN SYNTHESIS | Unit 3 Study Sheet #5 | Protein Synthesis | CHAP 10 | CHAP 9 |
| 3-24 | DNA TECHNOLOGY | Unit 3 Study Sheet #5 | DNA Technology | CHAP 12 | CHAP 10 |
| 3-26 | REVIEW IN CLASS | | | | |
| 3-29 | NO CLASS/ TAKE EXAM 3 | | | | |

Exam 3= Genetics Exam will be open on 3/26 at noon and will run through 3/29.

The exam is 45 questions and you have 60 minutes to complete it.

All students must take this exam by 3/29 at 11:59pm!

Unit 3 Genetics Learning Outcomes:

- Students will understand how the shape of DNA was discovered by Watson, Crick, Wilkins and Franklin.
- Students will know the chemical structure, shape and directionality of DNA.
- Students will understand the overall cell cycle and checkpoints that help regulate the cell cycle.
- Students will be able to describe DNA replication in S-phase of the cell cycle.
- Students will be able to list in order the five steps of Mitosis, 1-3 significant things that happen within each step and the overall result of this process.
- Students will be able to list in order the steps to Meiosis, 1-3 significant things that happen within each step and the overall result of this process.
- Students will compare and contrast Mitosis to Meiosis and know some problems with each processes.
- Students will be able to define basic genetics terms like recessive traits, dominant traits, genotypes, phenotypes, homozygous, heterozygous, autosomal chromosomes and sex chromosomes.
- Students will understand how Mendel helped formulate two Laws of Inheritance.
- Students will be able to complete a simple Mendelian Punnett Square.
- Students will be able to create and read a pedigree tracing a trait through a family.
- Students will look at five inheritance patterns that extend beyond Mendel's understanding of genetics.
- Students will be able to describe transcription and translation, know where these processes occur within the cell and be able to state the resulting product made in each process.
- Students will be able to take a given length of DNA and write the complimentary DNA strand, mRNA strand and AA strand created in protein synthesis.
- Students will discuss in class various ways we use DNA technology in our everyday lives including stem cell research, forensic science applications, genetically modified bacteria, virus or foods, cloning, genetic testing, DNA profiling, human gene therapy and some ethical issues relating to these applied uses of DNA.

Unit 4: Evolution

| DATE | LECTURE TOPIC | STUDY SHEET | YouTube VIDEO | CAMPBELL TEXT | CONCEPTS TEXT |
|-------------|----------------------------------|--------------------------|------------------------|---------------|---------------|
| 3-31 | NATURAL SELECTION | Unit 4 Study Sheet #1 | Natural Selection | CHAP 13 | CHAP 11 |
| 4-2 | EVIDENCE FOR EVOLUTION | Unit 4 Study Sheet #1 | Evidence for Evolution | CHAP 13 | CHAP 11 |
| 4-4 | Quiz #7 Due | | | | |
| 4-5 | MICROEVOL | Unit 4 Study Sheet #2 | Microevolution | CHAP 13-14 | CHAP 11 |
| 4-7 | MACROEVOL | Unit 4 Study Sheet #2 | Macroevolution | CHAP 14 | CHAP 11 |
| 4-9 | MICROBE EVOLUTION | Unit 4 Study Sheet #3 | Microbe Evolution | CHAP 15 | CHAP 12-13 |
| 4-11 | Quiz #8 Due | | | | |
| 4-12 | TREE OF LIFE EVOLUTION | Unit 4 Study Sheet #3 | Tree of Life | CHAP 16-17 | CHAP 13-15 |
| 4-14 | REVIEW IN CLASS | | | | |
| 4-16 | NO CLASS/ TAKE EXAM 4 | | | | |

**Exam 4= Evolution Exam will be open on 4/14 at noon and will run through 4/16.
The exam is 45 questions and you have 60 minutes to complete it.
All students must take this exam by 4/16 at 11:59pm!**

Unit 4 Learning Outcomes:

- Students will be able to describe how Charles Darwin and Alfred Wallace fit into history.
- Students will be able to describe the process of natural selection and give a real-life example of this process.
- Students will be able to list seven pieces of evidence for evolution.
- Students will understand historical classification systems and be able to read/create newer evolutionary trees.
- Students will be able to list at least five mechanisms for evolution and three patterns of selection.
- Students will be able to define the word species and will know the difference between prezygotic and postzygotic mating barriers.
- Students will be able to describe two mechanisms of speciation.
- Students will survey the tree of life and know the traits of the prokaryotic domains.
- Students will survey the tree of life and know the traits of the eukaryotic domain, including the traits that determine whether an organism is a plant, fungi or animal.
- Students will understand the theories about how the diversity of organisms on Earth has changed over time.

Unit 5: Human Body Form & Function

| DATE | LECTURE TOPIC | STUDY SHEET | YouTube VIDEO | CAMPBELL TEXT | CONCEPTS TEXT |
|-------------|------------------------------|-----------------------|-----------------------------------|---------------|---------------|
| 4-19 | HUMAN BODY INTRO | Unit 5 Study Sheet #1 | Human Body Introduction | CHAP 21 | CHAP 16 |
| 4-21 | HOMEOSTASIS & URINARY SYS | Unit 5 Study Sheet #2 | Homeostasis & Urinary System | CHAP 21 | CHAP 16 |
| 4-23 | DIGESTIVE SYSTEM | Unit 5 Study Sheet #3 | Digestive System | CHAP 22 | CHAP 16 |
| 4-25 | Quiz #9 Due | | | | |
| 4-26 | CIRCULATORY SYSTEM | Unit 5 Study Sheet #4 | Circulatory System | CHAP 23 | CHAP 16 |
| 4-28 | RESPIRATORY SYSTEM | Unit 5 Study Sheet #5 | Respiratory System | CHAP 23 | CHAP 16 |
| 4-30 | IMMUNE SYSTEM | Unit 5 Study Sheet #6 | Immune System | CHAP 24 | CHAP 17 |
| 5-2 | Quiz #10 Due | | | | |
| 5-3 | ENDOCRINE SYSTEM | Unit 5 Study Sheet #7 | Endocrine System Part I & Part II | CHAP 25 | CHAP 16 |
| 5-5 | REVIEW IN CLASS | | | | |
| 5-7 | NO CLASS/ TAKE EXAM 5 | | | | |

Exam 5= Human Body Exam will be open on 5/5 at noon and will run through MON 5/10.

The exam is 45 questions and you have 60 minutes to complete it.

All students must take this exam by MONDAY 5/10 at 11:59pm!

Unit 5 Human Body Learning Outcomes:

- Students will be able to list 11 human body systems and a short function for each.
- Students will be able to define homeostasis.
- Students will compare and contrast negative and positive feedback systems.
- Students will be able to describe how the human body maintains a constant body temperature.
- Students will be able to describe how the human body regulates water balance by osmoregulation with the help of the urinary and endocrine systems.
- Students will be able to trace the path of food through the human body, know the function of all the organs that participate in digestion, know what is required in human diets and know some associated problems with this system.
- Students will be able to trace blood throughout the double circulatory circuit, know the parts of the heart and how this functions to move materials throughout the body.
- Students will know the components of blood, what their functions are within the body and what is carried within blood.
- Students will be able to describe common cardiovascular disorders and some common treatments to these problems.
- Students will be able to trace air as it flows through the respiratory system, list the functions of the respiratory organs and understand four common problems with the respiratory system along with treatments for these problems.
- Students will understand the three lines of defense, which lines are innate verses adaptive, the cells that participate in these lines of defense and how the lymphatic system works with the immune system to fight off infections.
- Students will describe some common problems and treatments for the immune system.
- Students will look at 12 glands and twenty hormones to see how these chemicals help regulate human body function with the endocrine system.