SPRINGFIELD COLLEGE

COURSE INFORMATION

Course Title	**Basic Concepts of Modern Biology Lab**							
Course Code	**BIOL 102**		**Format**	**☒ Online**	**☐ Blended**	**☐ Traditional**		
Weeks	**☐ 12**	**☒15**	**☐ Other**	**Credit(s)**	**☒ 1**	**☐ 2**	**☐ 3**	**☐ 4**

COURSE DESCRIPTION

Basic Concepts of Modern Biology Laboratory is a semester long laboratory course where students perform hands-on laboratory exercises that illustrate important biological concepts.

PROGRAM LEARNING OBJECTIVES (PLO)

LO #	Objective
1	Demonstrate an understanding of science as a way of knowing about the physical and/or natural world.
2	Demonstrate the ability to assess the credibility of scientific information.
3	Demonstrate fluency in use of the scientific method to examine questions and draw conclusions about the physical and/or natural world.
4	Construct and test hypotheses using laboratory (physical and/or digital) equipment, field study practices, and appropriate quantitative methods.

COURSE LEARNING OBJECTIVES (CLO)

CLO #	Objective
1	Describe and identify scientific terminology
2	Collect, organize and interpret scientific data
3	Evaluate the validity of scientific arguments
4	Apply scientific knowledge it to current events
5	Differentiate between different cell types such as animal cell, plant cell and prokaryotic cells
6	Evaluate and interpret genetic inheritance
7	Use what they have learned to design and run their own experiments.

REQUIRED TEXTS

Name	Link/File Name
Concepts of Biology in OpenStax	https://openstax.org/books/concepts-biology/pages/1-introduction
OneNote ClassNote Lab Manual	Onenote lab Manual

GRADING OVERVIEW & SCHEME

Categories	Percentage Totals
Lab Notebook (Lab 1 - Lab 15)	75%
Discussions	25%
Total	**100%**

	Range		Range		Range		Range
A	95-100	**B**	82-86	**C**	73-75	**D**	62-65
A-	90-94	**B-**	79-81	**C-**	70-72	**D-**	59-61
B+	87-89	**C+**	76-78	**D+**	66-69	**F**	58 and below

Course Design Blueprint

This portion of the syllabus will be used by the Design Team to build your actual course. It will be removed from the final version of the syllabus. Please be as specific as possible and include any links, verbiage, or directions the students will need to complete the activities.

WEEK 1

Title			
The Importance of the Laboratory in Science			
Purpose Statement			
This week is the introduction of the Science Laboratory as well as the importance of an experiment and the steps it takes, called the scientific method. You will review scientific measures both in a traditional lab setting as well as home. You will learn to properly write a scientific conclusion using claim, evidence and reasoning. Lastly, we will talk about how your lab notebook should look and what is expected of you.			
PLO	**CLO**	**MLO**	**Learning Objectives (MLO)**
1	1	1	Review in-home lab safety, assignment deadlines, notebook setup and attendance
1	1	2	Evaluate the safety protocols in a given scenario.
1	1	3	Reflect safety protocols within a lab setting and discuss how something similar can be achieved at home.
2, 3	1, 3	4	Read and review the steps to making a scientific claim.
3	1	5	Recognize various types of controls and variables
2	3	6	Evaluate the validity of a provided scientific claim using Claim, Evidence, Reasoning.

MLO #	**Reading/Watching**	**Link/File Name**
1, 2, 3, 4, 5	Lab Manual: Chapter 1	https://springfield0-my.sharepoint.com/:o:/g/personal/gbartha_springfield_edu/EsbNRbQ8Tz9KiBVPUYS70BEBAL4NurIlC9P7I7TOsBWzTA?e=ZA5yXK
4, 6	CER - Claim Evidence Reasoning (Video)	https://youtu.be/5KKsLuRPsvU
1, 2, 3	Lab Safety Video	https://youtu.be/MEIXRLcC6RA

1, 2, 3	“My dad is a space alien commercial”	https://www.youtube.com/watch?v=sVRAtQ7XjkM
MLO #	**Activities**	
2, 3	**Discussion: Lab Safety Issues** Review the two images provided. One depicts an actual science lab, while the other illustrates a home lab. Regardless of setting, lab safety is important. For each photo, identify 3-5 lab safety issues that you see. Then, describe how each setting may present a safety challenge. Are any of those challenges different? This initial post is due Thursday. Then, reply to 1 of your peers’ posts. Did they identify any different challenges? What recommendations might you provide them to ensure their home lab is safe? Your reply is due Sunday.	
6	**Discussion: Claim, Evidence, and Reasoning** https://www.realsciencechallenge.com/27-12-items-cer-intro-activity/ In Brightspace, you will be supplied with a photo of 12 objects from my house. As you examine the photo, ask yourself: ● Why does my professor have these items? ● What do these items say about my professor? ● What claim can I make based off of the evidence in front of me? ● How can I back up my claim? You will then take out a sheet or paper and write a paragraph using the CER framework. First, come up with a CLAIM about the professor. Then, provide EVIDENCE for that claim. For your claim you will need several items together to support the claim. Finally, please provide REASONS why the evidence supports the claim. You will then post your CER from my photo. You will then post a photo of 12 objects from your home that have meaning to	

	you. Once you have made a post, please comment on two other posts completed by your classmates. This may require you to come back to Brightspace on another day as your classmates complete their discussions. Comments should include a Claim, evidence, reasoning for the objects in the post completed by the student. Please remember to be respectful to your peers and never make personal attacks. We are all here to learn.
	Assignment: Lab Notebook: Lab One Each week you will get assigned readings/videos and you will be asked to take notes. Some videos will have questions associated with them and some will not. Lines of text that are BLUE in color with a check box should be filled out in another color other than blue (such as PURPLE or RED). You will be graded on your answers. Your lab notebook entry is completed in Microsoft OneNote. For Lab Two, you will learn how to read a basic scientific article, where to find credible scientific research and also look at the difference between correlation and causation. **Due Sunday.**

WEEK 2

Title			
Science in the Media: Fact from Fiction: Science Research, correlation vs causation			
Purpose Statement			
This week you will learn how to read a basic scientific article, where to find credible scientific research and also look at the difference between correlation and causation.			
PLO	**CLO**	**MLO**	**Module Learning Objectives (MLO)**
1	1	1	Identify the parts of a scientific article
1, 2	1	2	Recognize the difference between correlation and causation
2	3	3	Critique a set of data within a set of scientific articles
3	1, 3	4	Reflect on the importance of carefully evaluating what we read

MLO #	Reading/Watching	Link/File Name
2, 4	The Danger of mixing up causality and correlation: Ionica	https://youtu.be/8B271L3NtAw
2, 4	3 kinds of bias that shape your worldview, TED talk by J. Marshall Shepherd	https://youtu.be/LcNvkhS4UYg
1, 2, 3, 4	Lab Manual: Lab Two	https://springfield0-my.sharepoint.com/:o:/g/personal/gbartha_springfield_edu/EsbNRbQ8Tz9KiBVPUYS70BEBAL4NurIlC9P7I7TOsBWzTA?e=uOTw6z

MLO #	Activities
	Assignment: Lab Notebook: Lab Two Each week you will get assigned readings/videos and you will be asked to take notes. Some videos will have questions associated with them and some will not.

	Lines of text that are BLUE in color with a check box should be filled out in another color other than blue (such as PURPLE or RED). You will be graded on your answers. Your lab notebook entry is completed in Microsoft OneNote. For Lab Two, you will learn how to read a basic scientific article, where to find credible scientific research and also look at the difference between correlation and causation. **Due Sunday.**
1, 2, 3, 4	**Discussion: Causality and Correlation** Please listen to and take notes on the TED talk on "The Danger of Mixing up Causality and Correlation" given by Ionica Smeets. Define causality and correlation and then give your own silly example as she had in the talk. Here is a great website to check out for examples https://www.tylervigen.com/spurious-correlations. Think of a real-world application as to when something was falsely said to have caused something else due to a correlation? Once you have made a post, please comment on two other posts completed by your classmates. This may require you to come back to Brightspace on another day as your classmates complete their discussions. Comments should include one positive item and one item that needs improvement. Please remember to be respectful to your peers and never make personal attacks. We are all here to learn.
4	**Assignment: Online Fact Checking Module** Go through Lesson One: Introduction to SIFT and Lesson Two: Investigate the Source. Then head over to your OneNote and complete your Online Fact Check Notebook.

	You do not need to submit anything in Brightspace. Due Sunday.

WEEK 3

Title			
The Chemistry of Life: Acids and Bases			
Purpose Statement			
This week you will do your first in-home lab exercise. You will not complete a full experiment but more of an observation. You will first learn about acids and bases through an online simulation. You will then be able to identify them with a homemade pH indicator. Please make sure to gather the list of materials ahead of time and make sure to watch the safety video.			
PLO	**CLO**	**MLO**	**Module Learning Objectives (MLO)**
1	1	1	Demonstrate the concept of an acid and base
1	1	2	Identify how H^+ iron and OH^- ion concentration and pH are related
2	2	3	Be able to identify common acidic and basic solutions
3	2,4	4	Understand how to read and interpret the pH scale
1	1,4	5	Describe what Anthocyanin is and how it relates to pH
3, 4	2	6	Record data and interpret data from observations (taste vs pH)
1, 2, 3	1, 2, 3	7	Make claims based on scientific evidence and support claims using scientific reasoning.
3	4	8	Relate why pH is important (cooking, gardening, etc).

MLO #	Reading/Watching	Link/File Name
1, 2	Concepts of Biology in OpenStax: Chapter 2.2	https://openstax.org/books/concepts-biology/pages/2-2-water
1, 2, 5	Lab manual: Chapter 2	OneNote Lab Manual

MLO #	Activities
3, 4, 5, 6, 7,	**Assignment: Lab Notebook: Lab Three** Each week you will get assigned readings/videos and you will be asked to take notes. Some videos will have questions

	associated with them and some will not. Lines of text that are BLUE in color with a check box should be filled out in another color other than blue (such as PURPLE or RED). You will be graded on your answers. Your lab notebook entry is completed in Microsoft OneNote. In this week's lab, you will make your own acid/base indicator from blended cabbage leaves and test various solutions. It is recommended that you take before and after photos of your results. Results and discussion will be filled out and submitted to brightspace. ● Complete prelab (simulation, watch video and answer questions) ● Make indicator solution ● Test various solutions with indicator and record results in your lab notebook

WEEK 4

Title			
Evolution			
Purpose Statement			
Over the last two week we have learned about the building blocks of life (DNA) and were briefly informed of the vast diversity of organisms. This week you will discover how those organisms are related and how they evolved over time for survival.			
PLO	**CLO**	**MLO**	**Module Learning Objectives (MLO)**
1, 3	**1**	**1**	Describe the key mechanisms by which evolution occurs.
1	**1**	**2**	Build and analyze phylogenetic trees.
4	**2, 3**	**3**	Make predictions and propose hypotheses based on available information.
3	**3 4**	**4**	Use real data presented in scientific figures and information from the film to make evidence-based claims.
2, 3	**3**	**5**	Analyze data presented in a scientific figure

MLO #	**Reading/Watching**	**Link/File Name**
1, 2	Evolution	https://youtu.be/JUM6NOARlO4
	Evolution	https://youtu.be/dyiZaHIRM6w
1, 3, 4, 5,	Lab Manual: Lab Four	Onenote Lab Notebook

MLO #	**Activities**
1, 3, 4, 5,	**Assignment: Lab Notebook: Lab Four** First you will be watching two videos for your prelab assignment on evolution. The first is: https://youtu.be/dyiZaHIRM6w and then second is https://youtu.be/JUM6NOARlO4 Then you will play an evolution game, missions 1 and answer questions: https://www.pbs.org/wgbh/nova/labs/lab/evolution/

	• **Build A Tree:** You will build phylogenetic trees themed around the evidence of evolution. You will identify relationships between species and to organize species and traits into phylogenetic trees. Throughout the lab you will watch several short video clips that introduce the mission and give context for how the theme of the mission helps us understand how evolution has shaped life on Earth.

WEEK 5

Title			
The Structure of Cells: Cells and Components			
Purpose Statement			
Last week we saw how DNA makes us all different. This week we will get to see plant DNA up close and personal. It is impossible to see a single DNA molecule with the naked eye and would take about 300,000 DNA molecules side by side to make a bundle as thick as a human hair. It is possible, however, to collect “large” amounts of DNA to make DNA visible. We will be extracting DNA from a strawberry.			
PLO	**CLO**	**MLO**	**Module Learning Objectives (MLO)**
4	**1**	**1**	Discuss benefits and drawbacks of the microscope
3,4	**1, 2, 7**	**2**	Identify parts of the strawberry with the microscope
1	**1**	**3**	Reflect on how the microscope can be used in real-world situations

MLO #	**Reading/Watching**	**Link/File Name**
1, 2, 3, 4, 5, 6, 7	Lab Manual: Lab Five	

MLO #	**Activities**
1, 2, 3, 4, 5, 6, 7	**Assignment: Lab Notebook: Lab Five** You will use your microscope to look at various organisms around the house as practice. You will then look at a strawberry, first the leaves, then the flesh and then you will extract out the DNA following the procedure in your lab manual. In your lab manual you will write down answers to questions from your handout. You will then include photos of your DNA and you will discuss why it is important for scientists to collect DNA.

WEEK 6

Title
How Cells Obtain Energy: Lactose Intolerance
Purpose Statement
Last week we learned all about cells and what they are made up of. This week we will look specifically at enzymes, which are important proteins within the cell. A specific enzyme found within the lining of our small intestine is called Lactase. Certain populations of people naturally carry this enzyme and it is used to help break down the sugar, lactose. We will look at what happens if you do not have that particular enzyme through an in home lab kit. This kit should have been ordered at the beginning of lab.

PLO	CLO	MLO	Module Learning Objectives (MLO)
1	1	1	Describe what an enzyme is and how it works
1, 3	1, 2, 4	2	Discuss what happens to a blood glucose level when they do and do not have the proper enzymes to digest lactose.
3, 4	2	3	Test for the presence of glucose using glucose test strips
3, 4	2	4	Graph data and appropriately
3	2	5	Interpret data from different biological tests to infer whether someone is lactase persistent or nonpersistent.
3	2, 3	6	Make claims based on scientific evidence and support those claims using scientific reasoning.

MLO #	Reading/Watching	Link/File Name
1, 2	*The Making of the Fittest: Got Lactase? The Co-evolution of Genes and Culture*	https://youtu.be/MA9boI1qTuk
2, 3, 4, 5, 6	HHMI Student Worksheet	https://www.biointeractive.org/sites/default/files/Lactase_Lab_Student.pdf
1	Amoeba sisters	https://youtu.be/qgVFkRn8f10
	Lab Manual: Lab Six	https://springfield0-my.sharepoint.com/:o:/g/personal/g

		bartha_springfield_edu/EsbNRbQ8Tz9KiBVPUYS70BEBAL4NurIlC9P7I7TOsBWzTA?e=lMN0LT
MLO #	**Activities**	
1, 2	**Assignment: Lab Notebook: Lab Six** First you will watch a video on Enzymes (https://youtu.be/qgVFkRn8f10) . Then you will watch a short video: https://youtu.be/MA9boI1qTuk. Following the video, you will simulate a lactose tolerance test, similar to the one shown in the short film *The Making of the Fittest: Got Lactase? The Co-evolution of Genes and Culture*, to determine which samples contain the lactase enzyme. You will follow the instructions in your lab manual.	

WEEK 7

Title			
Cellular Division: Cancer in Cells			
Purpose Statement			
It is understood that organisms are made up of cells and those cells need to replicate and divide. You have also learned the importance of the nucleus and the importance of DNA. This week we will learn about mitosis.			
PLO	**CLO**	**MLO**	**Module Learning Objectives (MLO)**
1	1	1	Explain the importance of mitosis and cell death during development, growth, and repair of the human body.
1	1	2	Describe the phases of the cell cycle and what happens in each phase.
2	4	3	Explain the relationship between cancer and the cell cycle.

MLO #	**Reading/Watching**	**Link/File Name**
1, 2	Concepts of Biology in OpenStax: Chapter 6.2	https://openstax.org/books/concepts-biology/pages/6-2-the-cell-cycle
3	Concepts of Biology in OpenStax: Chapter 6.4	https://openstax.org/books/concepts-biology/pages/6-3-cancer-and-the-cell-cycle
1, 2, 3	HHMI click and learn Eukaryotic Cell and Cancer	https://media.hhmi.org/biointeractive/click/cellcycle/
	Lab Manual: Lab Seven	https://springfield0-my.sharepoint.com/:o:/g/personal/gbartha_springfield_edu/EsbNRbQ8Tz9KiBVPUYS70BEBAL4NurIlC9P7I7TOsBWzTA?e=igvMwW

MLO #	**Activities**
1, 2, 3	**Assignment: Lab Notebook: Lab Seven** First you will click on the link to the Click and Learn https://media.hhmi.org/biointeractive/click/cellcycle/.

	This interactive module explores the phases, checkpoints, and protein regulators of the cell cycle. The module also shows how mutations in genes that encode cell cycle regulators can lead to the development of cancer. You will be able to toggle between two different views of the cell cycle by pressing the text in the center of the graphic. The “Cell Cycle Phases” view describes the cell cycle phases and checkpoints, and includes illustrations of the cell’s chromosomes. You will fill out this form https://www.biointeractive.org/sites/default/files/media/file/2020-02/CellCycleOverview-StudentWS-CL.pdf

WEEK 8

Title
Patterns of Inheritance: Blood Typing and Mendelian Genetics
Purpose Statement
From what you have learned from evolution, we have certain traits that were inherited from our parents. This week we will learn about dominant and recessive genes, as well as inheritance patterns. You will also explore non-mendalian genetics and discover what your blood type is.

PLO	CLO	MLO	Module Learning Objectives (MLO)
1	1	1	Define and explain the key genetic terms/concepts.
2	2	2	Distinguish between phenotypes for stem color and leaf color for three generations of Wisconsin Fast Plants®.
3	2, 6	3	Infer genetic traits from observed phenotypes.
4	2	4	Predict and test models for inheritance of the phenotypes for the plant specimens provided.
3, 4	3	5	Compare the predicted results with the data collected.
2	4	6	Interpret results of blood typing.
3	1, 4	7	Discuss results and determine why it is critical to know the person's blood type prior to transfusions.
1	7	8	Demonstrate proper lab safety.

MLO #	Reading/Watching	Link/File Name
1, 3	Concepts of Biology in OpenStax: Chapter 8.1	https://openstax.org/books/concepts-biology/pages/8-1-mendels-experiments

1, 3	Concepts of Biology in OpenStax: Chapter 8.2	https://openstax.org/books/concepts-biology/pages/8-2-laws-of-inheritance
1, 3	Concepts of Biology in OpenStax: Chapter 8.3	https://openstax.org/books/concepts-biology/pages/8-3-extensions-of-the-laws-of-inheritance
1, 2, 3, 4, 5, 6, 7, 8	Lab Manual: Lab Eight	https://springfield0-my.sharepoint.com/:o:/g/personal/gbartha_springfield_edu/EsbNRbQ8Tz9KiBVPUYS70BEBAL4NurIlC9P7I7TOsBWzTA?e=mKygGZ
MLO #	**Activities**	
1, 2, 3, 4, 5, 6, 7, 8	**Assignment: Lab Notebook: Lab Eight** You will first read about mendelian genetics and will demonstrate patterns of inheritance by planting three generations of seeds (F, P1 and P2). Results will take 48-72 hours. You will take photos of your results and you will write up a lab entry in your lab notebook. While waiting for your seeds to germinate, you will learn about non mendelian genetics and take an instant blood test to see what their blood type is. You will learn about how blood type is inherited.	

WEEK 9

Title
Molecular Biology and Biotechnology: Introduction to Biotechnology Methods
Purpose Statement
In the previous weeks, we learned about DNA, a ball of genetic information found in the nucleus of the cell. We will take what you have learned about genetic material and relate that to biotechnology. You will run an in-home experiment, using gel electrophoresis.

PLO	CLO	MLO	Module Learning Objectives (MLO)
1	1	1	List the steps of the polymerase chain reaction (PCR).
1, 2	1	2	Describe the function and benefit of utilizing restriction enzymes.
2	1, 3	3	Explain the principle behind the separation of biomolecules by gel electrophoresis.
1, 2	1	4	Identify and describe the function of the equipment involved in electrophoresis.
3	2	5	Interpret results.
1	7	6	Demonstrate proper lab safety

MLO #	Reading/Watching	Link/File Name
4, 5, 6	Lab Manual: Lab Nine	OneNote lab manual
1, 2, 3	Concepts of Biology in OpenStax: 10.1	https://openstax.org/books/concepts-biology/pages/10-1-cloning-and-genetic-engineering

MLO #	Activities
4, 5, 6	**Assignment: Lab Notebook: Lab Nine** This week you will run a simple gel and identify banding patterns to determine a genetic match. Make sure to read the lab manual on how to setup and run the experiment.

1, 2, 3, 4	**Discussion: Genetic Tests** Please identify a possible advantage and a possible disadvantage of a genetic test (i.e. 23 and me) that would identify genes in an individual. Once you have made a post, please comment on two other posts completed by your classmates. This may require you to come back to Brightspace on another day as your classmates complete their discussions. Comments should include one positive item and one item that needs improvement. Please remember to be respectful to your peers and never make personal attacks. We are all here to learn.

WEEK 10

Title
Molecular Biology and Biotechnology: Introduction to GMO's
Purpose Statement
Expanding on what we learned about biotechnology, this week we will talk about transgenic animals. You will complete a virtual lab through HHMI.

PLO	CLO	MLO	Module Learning Objectives (MLO)
1, 2	1	1	Describe how recombinant DNA technology is used to produce transgenic organisms.
3	1, 3	2	Explain how transgenic organisms can be used to explore biological processes.
3, 4	2	3	Collect and analyze data, including graphs.

MLO #	Reading/Watching	Link/File Name
1, 2, 3	HHMI: The Transgenic Fly Virtual Lab	https://media.hhmi.org/biointeractive/vlabs/transgenic_fly/index.html
1, 2, 3	Lab Manual: Lab 10	https://springfield0-my.sharepoint.com/:o:/g/personal/gbartha_springfield_edu/EsbNRbQ8Tz9KiBVPUYS70BEBAL4NurIlC9P7I7TOsBWzTA?e=38jmv6
1	Concepts of Biology in OpenStax: Chapter 10.	https://openstax.org/books/concepts-biology/pages/10-1-cloning-and-genetic-engineering

MLO #	Activities
1, 2, 3	**Assignment: Lab Notebook: Lab Ten** This interactive, modular lab explores the techniques used to make transgenic flies and demonstrates how these flies can be used to study gene expression. From what we have read, scientists use transgenic organisms, which contain DNA that scientists inserted in the organisms' genomes, to research many biological processes.

	In this lab, you will produce and conduct experiments with virtual versions of transgenic Drosophila fruit flies. You will first create transgenic flies that glow when a gene involved in circadian rhythms is activated. You will then use these flies in three experiments to examine gene expression under different conditions and in different locations in the fruit fly's body. As you go through the lab, make sure to fill out the accompanying worksheet: https://www.biointeractive.org/sites/default/files/Transgenic-Fly-Lab-Worksheet-Student.pdf

WEEK 11

Title			
Diversity of Life and Microbes: Antibiotic Resistance/ Bacteria Projects			
Purpose Statement			
This week you will work with the CDC and go through case studies as disease detectives. Your goal is to get to Level 3.			
PLO	**CLO**	**MLO**	**Learning Objectives (MLO)**
1	1	1	Identify the purpose of antibiotics
1	1	2	Explain what epidemiology is
1	1	3	Explain the difference between gram positive and gram negative
4	3, 4	4	Be able to diagnose a course of action for patients based off of given information

LO #	Reading/Watching	Link/File Name
1, 3	Bacteria: Amoeba Sisters	http://www.youtube.com/watch?v=ORB866QSGv8
2	CDC: What Is Epidemiology	https://www.cdc.gov/careerpaths/k12teacherroadmap/epidemiology.html
2, 3	Disease Detective	https://youtu.be/MGEqOOXm0vE
2, 3, 4	Solve the Outbreak *must use google chrome*	https://www.cdc.gov/mobile/applications/sto/web-app.html?fbclid=IwAR1U4d1qcC8gvleXMPGb2gM_-f4AphOp-fTurG6AGea7qwV6N1IaG7GY6wA
	Lab Manual: Lab Eleven	

MLO #	Activities
	Assignment: Lab Notebook: Lab Eleven Each week you will get assigned readings/videos and you will be asked to take notes. Some videos will have questions associated with them and some will not.

	Lines of text that are BLUE in color with a check box should be filled out in another color other than blue (such as PURPLE or RED). You will be graded on your answers. Your lab notebook entry is completed in Microsoft OneNote. Due **Sunday**.

WEEK 12

Title
The Immune System and Diseases: Viruses, Immunology, Vaccines
Purpose Statement
Last week we learned all about diseases and how they affect our body. This week we will learn about immunology and how to run an ELISA test.

PLO	CLO	MLO	Learning Objectives (MLO)
1	1	1	Compare and contrast bacteria and viruses.
1, 2	1, 2	2	Summarize what a vaccine is and its importance.
1	1	3	Review the importance of the immune system
1, 2	1, 2, 4	4	Explain how testing for antibodies can inform a medical diagnosis.
1, 2, 4	1, 4	5	Describe the purpose, procedure, and potential limitations of an ELISA.

LO #	Reading/Watching	Link/File Name
3, 4, 5	HHMI Immunology Lab	https://media.hhmi.org/biointeractive/vlabs/immunology/index.html
1, 2	NOVA | Immunity and Vaccines Explained | PBS	https://youtu.be/lXMc15dA-vw
	Antibiotics, Antivirals, and Vaccines	https://www.youtube.com/watch?v=uVUf_pt7Sh0
	The Immune System: Amoeba Sisters	https://youtu.be/fSEFXl2XQpc
2, 3	Concepts of Biology in OpenStax: Chapter 17.	https://openstax.org/books/concepts-biology/pages/17-1-viruses
	Lab Manual: Lab Twelve	https://springfield0-my.sharepoint.com/:o:/g/personal/gbartha_springfield_edu/EsbNRbQ8Tz9KiBVPUYS70BEBAL4NurIlC9P7I7TOsBWzTA?e=CpWcpz

MLO #	Activities
4, 5	**Assignment: Lab Notebook: Lab Twelve** This week you will do a virtual Immunology lab. This interactive, modular lab explores how the ELISA method can be used to test blood samples for evidence of certain diseases. The enzyme-linked immunosorbent assay (ELISA) is a laboratory technique that detects and measures specific proteins. It can show whether a patient has antibodies related to certain diseases, making it useful for medical diagnoses. In this lab, you will perform a virtual ELISA to test whether a particular antibody is present in a blood sample. You will complete the worksheet and submit it to brightspace.
1, 2, 3	**Discussion: Vaccines** After you complete the lab, please complete the discussion question in brightspace. With the knowledge of what you know about both bacteria and viruses, discuss the importance of a vaccine. How does your immune system play a role? Are there vaccines for both bacteria and viruses? Once you have made a post, please comment on two other posts completed by your classmates. This may require you to come back to Brightspace on another day as your classmates complete their discussions. Comments should include one positive item and one item that needs improvement. Please remember to be respectful to your peers and never make personal attacks. We are all here to learn.

WEEK 13

Title			
Animal Diversity			
Purpose Statement			
This week you will learn about the different animals in your area. From your reading you have learned about the different phyla or organisms.			
PLO	**CLO**	**MLO**	**Learning Objectives (MLO)**
1	1	1	Review the different animal phyla and classes
4	2, 7	2	Observe and photograph various local organisms and integrate what was learned to classify them

LO #	Reading/Watching	Link/File Name
1	Smithsonian Museum Natural History Tour	https://naturalhistory.si.edu/visit/virtual-tour
1, 2	Lab Manual: Lab Thirteen	OneNote Lab Notebook
	Classification: Amoeba Sisters	https://youtu.be/DVouQRAKxYo
1, 2	Concepts of Biology in OpenStax: Chapter 15 Summary	https://openstax.org/books/concepts-biology/pages/15-chapter-summary

LO #	Activities
1, 2	**Assignment: Lab Notebook: Lab Thirteen** 1. Take a look at the organisms that are around your house, outside, or in a virtual museum tour. There are a variety of different classifications (Annelida, Arthropoda, Chordata, Cnidaria, Echinodermata, Mollusca, Nematoda, Platyhelminthes, Porifera, etc) that you should become familiar with. These organisms can be as little as a window spider and as large as deer. Some common examples, depending on location, include squirrels, deer, rabbits,

	insects, snails, slugs, worms, fish, lizards, birds, cats, dogs, snakes, turtles etc. 2. Try and find **10 DIFFERENT organisms** (inside such as pets or pests, and outside). Five of the 10 organisms *can* be from a virtual museum tour (if you are having trouble finding organisms) found here: https://naturalhistory.si.edu/visit/virtual-tour . **Among those organisms, there should be at least 5 different phyla represented.** 3. Take a photo of the organism and then record important information about the organism (classification, common name, scientific name (if possible) and a brief description). 4. There are 6 main clades (metazoa, eumetazoa, deuterostomia, bilateria, lophotrochozoa, and ecdysozoa) that contain the classifications above. You should be able to draw a phylogenetic tree of how they relate. Where do you organisms fit on that phylogenetic tree? 5. Use all the information that you have gathered for this class to write what is common among them and what is different. For example if you see a bird, fish, cat, dog, squirrel, ant, spider, worm, lizard and tick what do they have in common and what makes them different.

WEEK 14

Title			
Ecosystems			
Purpose Statement			
This week you will take what they learned about animal diversity and you will learn how they interact in their habitat. You will learn about trophic levels and particular species that have a greater impact than others.			
PLO	**CLO**	**MLO**	**Learning Objectives (MLO)**
2	4	1	Identify the different scientists in the video and what role they played in science
1	1	2	Describe what a keystone species is
1	1	3	Describe what it means to be top down vs bottom up
3	1	4	Explain what would happen to an ecosystem when a particular species is removed
3, 4	2, 4	5	Examine the immediate area surrounding you and use what you have learned to identify a particular keystone species.

LO #	**Reading/Watching**	**Link/File Name**
	Lab Manual: Lab Fourteen	https://springfield0-my.sharepoint.com/:o:/g/personal/gbartha_springfield_edu/EsbNRbQ8Tz9KiBVPUYS70BEBAL4NurIlC9P7I7TOsBWzTA?e=WBWV8b
1, 2, 3, 4	Serengeti Rules Documentary	https://www.pbs.org/wnet/nature/the-serengeti-rules-41dfru/20105/
2, 4, 5	Wolf Reintroduction Changes Ecosystem in Yellowstone	https://www.yellowstonepark.com/things-to-do/wolf-reintroduction-changes-ecosystem
2, 4	How Wolves Changed Rivers	https://youtu.be/ysa5OBhXz-Q
LO #	**Activities**	

1, 2, 3, 4	**Assignment: Lab Notebook: Lab Fourteen** You will watch the Serengeti Rules documentary and complete the questions.
	Get assigned teams for your citizen project for the following week.

WEEK 15

Title
Conservation and Biodiversity: Citizen Science
Purpose Statement
This week you will learn about citizen science. Citizen science is the collection and analysis of data relating to the natural world by members of the general public, typically as part of a collaborative project with professional scientists. You will be given a number of sources and will have to choose a project to work on.

PLO	CLO	MLO	Learning Objectives (MLO)
1	1	1	Identify what citizen science is.
3	2, 3	2	Evaluate your experience of participating in a citizen science project
4	3, 7	3	Collaborate ideas on your own citizen science project to another group member.
3	3	4	Summarize overall experience in a paper or video

LO #	Reading/Watching	Link/File Name
1	Citizen Science	https://www.youtube.com/watch?v=SZwJzB-yMrU
1	Zooniverse	https://www.zooniverse.org
1, 2, 3, 4	Lab Manual: Lab Fifteen	OneNote

LO #	Activities
1, 2,	**Assignment: Lab Notebook: Lab Fifteen** You will choose a citizen science experience from zooniverse or another similar platform. You will partake in the exercise for about an hour or two and reflect on your experience.
3, 4	**Discussion: Design a Citizen Science Project** Last week you were assigned a partner. After you have completed the citizen science lab activity above, you are then encouraged to collaborate with your partner to design another citizen science project and explain how that can aid in research. Once you have developed your citizen science

	project, you and your partner will then post your proposal idea in the forum. Once you have completed your post, please post on two other teams' posts. Things to include in your project proposal: ● Title of project ● Targeted Audience ● Description of Project ● Background information ● Possible training for volunteers ● What do you get from the information you gather? How does this contribute to science? Initial post due **Thursday**. Replies due the **last day of the course.**

DEVELOPER NOTES

Please use this area to share any comments or notes regarding your course with the Design Team.

-- End of Course Design Blueprint --

COURSE SCHEDULE

Week	Activity Titles
1	Discussion: Lab Safety Issues Discussion: Claim, Evidence, and Reasoning OneNote: Lab Notebook: Lab One
2	OneNote: Lab Notebook: Lab Two Discussion: Causality and Correlation
3	OneNote: Lab Notebook: Lab Three
4	OneNote: Lab Notebook: Lab Four
5	OneNote: Lab Notebook: Lab Five
6	OneNote: Lab Notebook: Lab Six
7	OneNote: Lab Notebook: Lab Seven
8	OneNote: Lab Notebook: Lab Eight
9	OneNote: Lab Notebook: Lab Nine Discussion: Genetic Tests
10	OneNote: Lab Notebook: Lab Ten
11	OneNote: Lab Notebook: Lab Eleven
12	OneNote: Lab Notebook: Lab Twelve Discussion: Vaccines
13	OneNote: Lab Notebook: Lab Thirteen
14	OneNote: Lab Notebook: Lab Fourteen
15	OneNote: Lab Notebook: Lab Fifteen Discussion: Design a Citizen Science Project

ONLINE COURSE FORMAT

The format for this class will be consistent with adult learning practice and is based on the exchange of knowledge, experience, and skills between students and instructor. The instructor will serve as a facilitator for discussions and practical exercises engaged in by the participants. Classes will be interactive, thought provoking and participatory. This course will communicate via Brightspace ONLY. You will be expected to post course assignments and participate in forums (often referred to as “threaded discussions”) online. Assignments are meant to engage students in a way that requires thoughtful research and analysis rather than “reporting” information.

ATTENDANCE POLICY

Students are expected to attend classes; for online and blended courses, participate in weekly activities. In some circumstances, a student may be absent from classes for College-excused absences noted below. Beyond those College-excused absences, each instructor has the freedom to set a specific attendance policy for his or her class and is responsible for communicating that policy to class members via the syllabus.

If a student misses a class meeting or does not complete required activities in a blended or online class for any reason, including illness, emergency, or College-excused absences, he or she is still responsible for the material covered and any assignments due.

Faculty are required to report student attendance for face-to-face courses and engagement in online or hybrid courses at the beginning of the semester and again as part of mid-term grading. Financial Aid will only be disbursed after a student satisfies the following attendance expectation as reported by faculty at the beginning of the semester:

- For face-to-face courses, a student must be present in the classroom to be considered as “attending”.
- For online courses, a student who has completed the required online activities is considered as “attending”.
- For blended courses (which consist of a combination of online and face-to-face sessions), completion of online activities and/or attendance of the in-class meeting is considered as “attending”.

Federal regulations require Springfield College to accurately track students who may or will be withdrawing from courses or from the College. ***Therefore, if at any point during the semester, a student stops regularly attending a face-to-face course or stops completing required online activities in a blended or online course, faculty are required to immediately notify the Registrar’s Office.***

ABSENCES DUE TO ILLNESS OR EMERGENCY

In the event of an absence due to illness or emergency, students should notify their professors as soon as possible via email, through the LMS and/or via phone. Students should ask about options for obtaining missed material and whether it is possible to make up missed work. In the event of an extended illness or emergency, students should also notify the Dean of Students (studentaffairs@springfield.edu or 413-738-3922).

COLLEGE-EXCUSED ABSENCES

The following situations should be recognized as College-excused absences from class:

1. Participation in an intercollegiate athletic contest (including travel time) approved by the athletic director and posted on the Springfield College Athletics website.
2. Participation in a scheduled College curricular or co-curricular activity approved by the appropriate dean or vice-president and on file in the dean of students' office.
3. Observation of religious holidays.

In order to be considered as excused, the student follows the guidelines listed below:

- For intercollegiate athletics or other scheduled curricular or co-curricular activities, the student must provide his or her instructors with a list of dates of

expected absences by the end of the first week of class and discuss with each instructor the impact of such absences. If the instructor deems that the absences will interfere with the student's ability to successfully complete the objectives of the course, the student must seek to reduce the absences or drop or withdraw from the course.

- The student should arrange in advance of the absence for the make-up of any work that will be missed and for submission of any assignments due.
- The student should notify the instructor as soon as possible in the event of a sudden change of schedule (for example, participation in a game rescheduled due to rain or joining a co-curricular activity mid-semester) and provide documentation if requested. Again, the impact of the absence(s) must be discussed with the instructor.

If possible, the instructor should allow the student to make up the class work or complete an alternative assignment.

ASSIGNMENT SCHEDULE & DUE DATES

The Learning Management System "Server Time" is set to Eastern Standard Time (EST). Therefore, the deadline for activities found in this syllabus is based on EST. Please pay close attention to your time management to prevent late submissions.

Original discussion posts should be posted no later than Thursday of the online week with all remaining activities due by the last day of the online week (Sunday).

A course week is defined as Monday morning beginning at 12:01 am EST and concluding on the following Sunday at 11:59 pm EST.

PARTICIPATION

After the first two weeks of the term, student participation in online activities and face-to-face class sessions will count significantly toward the grade but will not be recorded as attendance. Students can only earn points for academic work that the class completed during the face-to-face class meetings or during a weekly period of online activities and must be engaged in the activities during the time-frame specified by the instructor.

COURSE PARTICIPATION

Definition of Online Class Participation

- The success of your learning experience in online discussion is dependent on the active participation of all students. Therefore, it is imperative that you enter each discussion link prepared to participate in the class discussions, which requires that you not only post your responses to the questions in a timely manner allowing time for others to respond, but you must also respond/react/provide substantive feedback to other’s postings.
- It should be noted that not all engagement in class discussions constitutes substantive class participation. Class participation in an online environment is characterized by the following:

- Connects personal experiences to the concepts being studied, gives an orderly, brief version of the experience, with a point that is stated clearly;
- Avoids repeating points made by others;
- Shows evidence of having completed, understood, and applied the reading for the course;
- Incorporates shared ideas to create an understanding of the concept under discussion;
- Poses real-life questions or challenges that spring from the discussion and attempts to shape an informed conclusion.

GRADING

This course will use a weighted grade book.

- A weighted grade book will have different categories (i.e. Discussions or Assignments).
- Each category will be worth a certain percentage of your total overall grade.
- Within each category, there will be a certain number of activities. For example, there will be a certain number of discussions in your discussion category which make up a specific percentage of your total grade.

To see how your grades are weighted and to see how many activities make up each category for this course, please view Grades within your Brightspace classroom.

- To see view your syllabus, please navigate to "Content" > "Start Here" > "Course Info & Syllabus."
- To view your grade book, please navigate to "Grades" on the menu at the top of the screen.

- In the Grades section of your Brightspace classroom, you will notice each task is worth 100 points. Please note 100 points is weighted differently based on the category.

ACADEMIC ASSISTANCE

A wide variety of academic assistance is offered through the **Academic Success Center** in the Harold C. Smith Learning Commons, Suite 300 (3rd floor). To contact the ASC, please call 413-748-3389 or email asc@springfield.edu. During the fall and spring semesters, the ASC is open Monday-Thursday, 9am-9pm; Friday, 9am-3pm; and Sunday, 4-9pm:

Disability & Accessibility Services

- Disability & Accessibility Services works with students with disabilities to provide appropriate accommodations, auxiliary aids, and services that facilitate equal access and meaningful participation in their educational experiences at Springfield College. To schedule an appointment or request accommodations, please contact the ASC by calling 413-748-3389, emailing ASC@springfield.edu, or stopping by the ASC located in the Learning Commons, Suite 300 (on the 3rd floor).

Tutorial Services

- Regional campus and online students should contact an Academic Success Coach for tutorial support.

Academic Coaching Program

- Regional campus and online students should contact an Academic Success Coach for tutorial support.
- The Academic Progress Program provides assistance and support for the students in academic jeopardy to help improve their academic skills, performance and standing.

MTEL Assistance Program

- The MTEL Assistance Program provides support for students preparing to take the Massachusetts Tests for Educator Licensure®.

DISABILITY-RELATED ACCOMMODATIONS

Springfield College is committed to an inclusive and accessible educational environment for students with disabilities. If you need academic accommodations due to a disability or disabling condition (including temporary disabilities), please contact the Academic Success Center's Disability & Accessibility Services. They will work with you on an individualized, case-by-case basis to determine eligibility and develop an appropriate accommodation plan. To schedule an appointment, please call 413-748-3389, email ASC@springfield.edu, or stop by the ASC located in the Learning Commons, Suite 300 (on the 3rd floor).

Please note: it is your responsibility to follow the procedures outlined by Disability & Accessibility Services for determining eligibility and requesting accommodations **in advance** each semester and/or as needed. Accommodations cannot be provided retroactively.

This class may be recorded or transcribed if an enrolled student has been approved for this service as an academic accommodation by the Academic Success Center's Disability & Accessibility Services. Recordings are for the approved student's individual access only, and are not to be shared, copied, or distributed to others. For questions or concerns about acceptable use, please contact the Academic Success Center: 413-748-3389, asc@springfield.edu, or Learning Commons 300.

ACADEMIC HONESTY AND INTEGRITY POLICY

BASIC POLICY

Springfield College students are expected to be honest in all elements of the academic process, including coursework, use of College documents, and when serving as representatives of the College. Cheating, plagiarism, misrepresentation of facts, omissions, or falsifications in any connection with the academic process are violations of the Academic Honesty Policy (hereafter referred to as the Policy). Students found to be in violation of this Policy are subject to a range of sanctions, including, but not limited to, a reprimand, failing a course, and suspension or expulsion from the College.

For the more information, please review the entire Academic Honesty and Integrity Policy here:
http://catalog.springfield.edu/content.php?catoid=77&navoid=2086#acad_hone_and_inte_poli