BIO 101: Introduction to Biology
Fall & Winter 2021-2022
Credits: 5 CWU

Mrs. Santjer
Room 2305

Note: *This syllabus is to be considered a living document* and therefore subject to change. Changes will be made announced in class and via Canvas. If you miss a class, it is your responsibility to check with classmates/Canvas Announcements for any changes.

Contact Information

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Course Description

Required Text

Belk, Colleen & Borden Maier, Virginia. *Biology Science for Life with Physiology*. (6th ed.). 2019

Grading

Assignments (Discussion Boards)	15%
Labs (At least one per unit)	35%
Tests (One per unit)	50%

***Extra Credit is not offered**. Please don't ask.

Grading Scale

Point	Letter	Percentage
4.0	A	93-100
3.7	A-	92-90
3.3	B+	87-89
3.0	B	83-86
2.7	B-	80-82
2.3	C+	77-79
2.0	C	73-76
1.7	C-	70-72
1.3	D+	67-69
1.0	D	60-66
0.7-0.0	F	0-59

Expectations, Responsibilities, Policies, etc.

College is a place for the open exchange of ideas and views. This is how true learning takes place. Discrimination based on ethnicity, religion, socioeconomic status, etc. or intolerance of divergent viewpoints expressed is unacceptable.

Academic dishonesty pertains to any form of cheating (copying from another's test, plagiarism, etc.) and will be dealt with according to all the rules, procedures and penalties as spelled out in the Student Handbook. What is plagiarism? – Go to: http://www.plagiarism.org/article/what-is-plagiarism to find out.

While you are most certainly encouraged to consult with your classmates regarding test and paper *preparation*, the finished product must be of your own making.

Discussion Boards (DB's): Ample time to submit your position and respond to others is provided. No submissions are allowed after the date/time closure. Any missing work will automatically receive zero (0) pts.

> **Guidance for all DB's**: DB's are designed to prompt thoughtful consideration of issues related to classroom topics but applying more to everyday situations and to prepare the student to participate in classroom discussion of them. We all have different thoughts on issues and, hopefully, your position on them will become more sophisticated by reading, video assignments, and the contributions of your peers. DB's are the place to share what you have learned and what you think about issues. Here is the place that *critical* and *analytical thinking* can be forwarded. These posts are a place for you to take a well-thought-out position and defend it with evidence and reason. If you cannot or will not engage in thoughtfulness and reflection about issues, *you will* hinder the likelihood of your success in this course. It will show through to the instructor if you are simply mimicking others or parroting back positions in your written responses.
>
> DB's are worth 20 pts. each. The first ten (10) points will be an assessment of your position and thoughts as to why you take that position. **Accomplish this first and identify it as your "*Position*"**. This will make it easier for the instructor and your peers to identify it. The other ten (10) pts. will be an assessment of your conversation with others regarding their thoughts and positions. The earlier you post your position, the more opportunity time you will have to comment on other's - so don't procrastinate. Responses will likely vary in terms of their quality. In order to help assure best marks, it is advised that you respond to, ***at minimum***, three or four others. Be ***constructively* critical** of other's positions/comments. The purpose of this is to challenge your thoughts and refine your position. Who knows? – You might even decide to abandon your original position altogether! This is how learning takes place.
>
> Initial DB's are due by midnight on Thursdays with responses to peers due by midnight on Sundays.

Plan accordingly. DB's should demonstrate your attention and sharing over the time allotted for it. Swooping in on the last hours of the assignment to complete it reflects poorly on you. It adversely affects not only your learning but that of others who won't benefit from your insight and wisdom.

Murphy's Law: If something can go wrong, it will. Do NOT wait until the last moment to complete or submit assignments. Allow for the possibility that you may become ill, your flash drive may malfunction, or your computer may crash (in addition to the run-of-the-mill canine-involved incidents). These inevitable problems are often avoidable. They will not be cause for an extension of the due date. PLAN AND DO NOT PROCRASTINATE.

General College-Level Expectations of Students:

1. Carefully read the course syllabus and be familiar with duties, responsibilities, and expectations, etc. therein.
2. Attend class rested and ready to fully engage with the material.
3. Attend all scheduled classes.
4. Avoid tardiness.
5. Be prepared to answer and ask questions and discuss material relevant to issue/topic.
6. Take presentation notes.
7. For every hour of in-class time, spend *at minimum*, 1.5 hours of outside of class study time.
8. Take notes on concepts, terms, theories, and seminal events from assigned reading, outlines, and presentation and state one's understanding of these *in your own words*.
9. Be able to *apply* concepts, terms, theories, and seminal events regarding how they help inform understanding of relative institutions, processes, and issues.
10. Engage in substantive critical and analytical thinking about relevant issues, ideas, and positions.
11. Be tolerant of views divergent from one's own.
12. When critically evaluating the contributions of other students, do so constructively and respectfully.
13. Consult the instructor initially and directly regarding any course-related challenges experienced.
14. Avoid any behavior that will impede upon another student's learning.
15. If a class is missed, obtain that day's administrative, presentation and discussion notes from a fellow student.
16. Complete and submit all assignments by due date.
17. Attend to proper spelling, grammar, punctuation and syntax in all correspondence and assignments.
18. Keep abreast of all notifications sent via Canvas "Announcements".
19. Be personally responsible for learning and academic success.
20. College is about further academic or career preparation; practice professional conduct consistently.

Changes to the Syllabus: This syllabus is to be considered a “living” document subject to change. Any changes to syllabus content or its course schedule will be announced by the instructor.

Module 1: Nature of Science

8/30-9/3

Reading: pgs. 2-23

Lab: Scientific Methods Oreo Lab

DB: How much evidence do we need to conclude that a hypothesis is true? Should it be different for different situations? For example, compare testing a medicine that could have bad side effects to working out which of two approved fertilizers most improve crops.

Test: 9/7 Evaluation Information Essay

Module 2: Biological Chemistry

9/8- 9/14

Reading: pgs. 30-43

Lab: Macromolecules McMush Lab

DB: Do sugary drinks cause hyperactivity in children? Do some web-based research using scientifically sound resources on sugary drinks and hyperactivity in children. Make a statement based on what you have learned. Include links to your resources (articles).

Test: 9/15 Chapter 2

Module 3: Cell Structure and Function

9/16- 9/23

Reading: pgs. 50-64

Lab: Cell Transport Osmosis and Diffusion

DB: There is a lot of activity in a cell! How does a cell work? What parts of a cell work together? This discussion will be based on the following simulation:

You are a primitive bacterial cell from an alien planet. During your trip in space you

meet a trader named Zork. He is selling organelles and cellular structures from Earth. Wow! Your species has always dreamed of evolving into a multicellular organism like those found on Earth! You have 50 gold specs (GS) and want to purchase some of Zork's supply. What will you purchase? Will you purchase everything you want at once, or will you try out one or two and come back for more later (can be generations later)? You can come back multiple times too.

Here is Zork's inventory:
Fimbriae 5 GS
Nucleoid 5 GS
Capsule 5 GS
Flagella/Cilia 5 GS
Nucleus 10 GS
Ribosomes 10 GS
Rough Endoplasmic Reticulum (ER) 10 GS
Smooth ER 10 GS
Golgi Apparatus 15 GS
Lysosomes 10 GS
Vacuoles 10 GS
Peroxisomes 10 GS
Mitochondria 20 GS
Chloroplasts 20 GS
Cytoskeleton 15 GS
Extracellular Matrix 15 GS
Cell Junctions 20 GS
Cell Walls 15 GS

In your post tell us why you purchased each organelle you did. How do you think they will help you evolve into a multicellular organism? What kind of multicellular organism do you think this will help you evolve into? Keep in mind the organelles you already have (you are a bacterial cell, remember, though primitive). Would eukaryotic organelles be better for helping you evolve into a multicellular organism? Maybe you just want upgraded bacterial organelles and structures. If you don't spend all your money tell us why.

Test: 9/24 Chapter 3

Module 4: Enzymes

9/27- 9/30

Reading: pgs. 70-72

Lab: Enzyme Catalase

DB: Discuss the role enzymes play in a metabolic pathway you find the post important. Include the goal of the pathway, the types and names of molecules/metabolites/ functional groups involved. Address at least one key reaction catalyzed by the enzymes in detail. Explain why you chose this enzyme and why you think it is important.

No Test

Module 5 Cellular Respiration and Photosynthesis

10/1-10/15

Reading: pgs72-81, 86-101

Labs: Pea Respiration & Floating Disc (two separate labs)

DB: We are regularly bombarded with advertisements for supplements that will help us lose that ugly fat the fast and easy way with no diet or exercise required. Your roommate insists on purchasing every new supplement that hits the market in the hopes of shedding a few pounds. As a scientifically educated person, you know that the Food and Drug Administration does not regulate these supplement companies and that their claims are typically not backed by good scientific evidence. Explain to your roommate some of the risks associated with taking these supplements (based on what you know about cellular respiration and metabolism) and what will work best to lose weight.

Test: Chapter 4 & 5

Module 6: Cell Cycle

10/18-10/22

Reading: pgs. 108-119

Lab: Mitosis

DB: Cells in different tissues of a fully developed human show significant variations in the length of time that they remain in the G0 phase of the cell cycle: muscle (lifetime), nerve (lifetime), adipose (years), liver (year), erythrocyte (months), bone osteoclasts (weeks), leukocyte (days), and epidermal (hours). For each of these types of tissues**,** propose a reason based on internal and external factors and function that might account for the differences among their longevities.

No Test

Module 7: Meiosis

10/25-11/2

Reading: pgs. 125-136

Lab: Meiosis

DB: In eukaryotes, sexual reproduction involves the recombination of heritable information from both parents via meiosis followed by fertilization. Meiosis reduces the number of chromosomes from diploid (2n) to haploid (1n) during the production of gametes. Meiosis begins with the duplication of DNA, producing four strands of DNA in two pairs of homologous chromosomes: 2(2n) becomes 4(n), that is, four haploid cells, where n is the number of strands of DNA in a chromosome.

A. **Construct** an explanation of the importance of random, independent assortment to genetic variation by **creating a diagram** that represents homologous chromosomes during prophase I without crossover and the possible arrangements of these chromosomes during metaphase I:

- without recombination during prophase I
- with recombination

Test: 11/3 Chapter 6 & 7

Module 8: Genetics

11/8-11/18

Reading: pgs. 142-160

Lab: HHMI Sickle Cell

DB: Some traits are inherited in a Mendelian fashion, others are not. Let's explore non-Mendelian inheritance a little more. In the discussion this week research a trait that is inherited in a non-Mendelian fashion. Discuss the trait and the inheritance pattern.

Test: 11/19 Chapter 8

Module 9: DNA Profiling

11/29-12/8

Reading: pgs. 167-178

Lab: Restriction Enzymes

DB: Capital Punishment is a legal penalty in the US and is used by the federal government and by 32 of the 50 states (Washington is one) as punishment for the most heinous crimes. Since 1977, after the supreme court overturned a decade-long ban on the practice, more than 1,400 people have been legally executed in the US. However, the US is one of the few countries in the world that permit capital punishment. A DNA profile is often used to determine who committed a crime. Identical twins have identical DNA, making DNA hard to use in determine who committed a crime. How about DNA profiles of unrelated people? Scientists estimate that DNA between people only differs by 0.01%. Knowing that capital punishment is a viable punishment for a crime, is DNA profiling a fool proof way to determine guilt and should it be used as a form of evidence in a crime?

Test: 12/9 Chapter 9

Module 10: Protein Synthesis and Expression

12/9- 12/16

Reading: pgs. 184-201

Lab: PGlo

DB: in 20016, Nobel Laureates signed a letter urging the Greenpeace organization to end its fight against GMO's. These scholars contend that those who continue to fight against GMO's are obstructing advances that would possibly feed the world's hungry people. Should anti-GMO activists give up the fight? Does growing GMO's really yield more food?

Test: 12/17 Chapter 10

Module 11: Evolution

1/3-1/13

Reading: pgs. 206-232

Lab: ADI #23

DB: Evolution led to the development of every feature you have. Think about a feature that you think might have an interesting developmental evolution, such as the evolution of hands or eyes or cat claws, research it, and post a paragraph about what you have learned about the evolution of that feature with a link to your sources. You must discuss evolution of the feature, not just interesting facts about it.

Test: 1/14 Chapter 11

Module 12: Natural Selection

1/18-1/26

Reading: pgs. 238-256

Lab: HHMI Darwin's Finches

DB: Are all features of living organisms' adaptations? How could you determine if a trait in an organism is a product of evolution by natural selection? Choose a human trait, research it. Explain if it was a product of natural selection and if not, explain why you believe it was not.

Test: 1/27 Chapter 12

Module 13: Speciation

1/28-2/8

Reading: pgs. 263-285

Lab: ADI #25

DB: Massive events can contribute to speciation, but so can minor ones. In the discussion this week we are going to explore some of those massive events that have occurred through history causing evolution and speciation. For your post this week please describe how continental drift, mass extinctions, or adaptive radiations contribute to speciation and provide an example of how your event leads to speciation. This example can be a real one or an idea you made up. Please cite sources when needed!

Test: 2/9 Chapter 13

Module 14: Biodiversity

2/10-2/23

Reading: pgs. 297-316

Lab: HHMI Gorongosa

DB: Human impacts on the environment can be obvious and have an immediate effect, like oil spills. They can also be less obvious due to the time it takes for the negative consequences to become apparent, like pollution and climate change. Research a threat to biodiversity caused by humans. Discuss the threat and suggest ways we could stop it.

Test: 2/24 Chapter 14

Module 15: Population Ecology

2/24-3/8

Reading: pgs. 324-335

Lab: Lynx and Hare

DB: Africa is the only continent where increases in food production have not outpaced human population growth. Many of the most severe food crises are in African countries. Should those of us in the more developed world assist African populations? How? Explain the factors that influence your stance on this question.

Test: 3/9 Chapter 15