

Syllabus – Fall 2020

Biology 101 sec 01 : Concepts/Apps in Biology 1 (CRN 13238)

MWF 11:00 AM – 11:50 AM Rita Liddy Hollings Science Center 103

INSTRUCTOR

Dr. Farahdiba Jafri PhD

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OFFICE LOCATIONS: SSMB Room no. 326

Cell no. 843-810-9599 (to be used only in case of emergency)

OFFICE HOURS: M/W : 9:00 am - 10:00 am .You may also email me to schedule an appt. at another time.

Zoom Virtual office hours : F 9:00 am – 10 am (Zoom ID)

Course Description

To provide non-science majors with a general overview of living systems, with emphasis on cellular and molecular concepts, including biochemistry, cell structure and function, respiration, photosynthesis, genetics and molecular biology. The goal of the course is to provide a foundation for students to appreciate, understand and critically evaluate biological issues facing society

Co-requisites

BIOL 101 Laboratory – you **MUST** enroll in a lab section in addition to this lecture.

Required Course Materials

1. **Textbook:** *Biology: Concepts and Applications*, by Starr, Evers & Starr, Tenth Edition, (Cengage Publishers). You can buy it, rent it, get the ebook, borrow it, or share it with a classmate, but you **MUST** have access to this textbook! You will also need it for Biology 102. **Keep up with the reading!**



Suggested Course Material

Center for Student Learning – I encourage you to utilize the Center for Student Learning (CSL) and their academic support services for assistance with study strategies and course content. They offer tutoring, Study Skills appointments, and workshops that help students of all abilities become more successful throughout their academic career. Services are available to you at no additional cost. For more information, please visit the CSL website at <http://csl.cofc.edu>, or call (843) 953-5635, or drop by their location on the first floor of the Addlestone Library.

Teaching Philosophy in the era of COVID-19

This virus is going to be with us for a while , and we are going to do our best to make sure that you get the most out of this learning experience, while staying safe and healthy , because of COVID-19 this course will be taught as a hybrid course Face to Face (F2F) and online course . **Monday and Wednesdays you will be meeting F2F with me in scheduled classroom on Fridays you will be meeting online using zoom during our normal class times .**

If you don't already have a zoom account through the CofC , go to <https://cofc.zoom.us/> to sign up . Its FREE !

Class Climate & Netiquette

- ☆ As stated on page 75 of the Student Handbook: “a college classroom requires a higher level of courtesy than many people exercise in ordinary public space. Everyone in a classroom is there for the purpose of learning, and no one should be able to deprive another person of the chance to learn. Expressions of rudeness and even carelessness degrade the high purpose of learning that should be paramount in a college classroom.” This applies equally to the online classroom. Don't be a **troll!**

- ☆ To maintain a respectful and supportive environment, please uphold these rules of netiquette. **Netiquette** is network etiquette, the do's and don'ts of online communication.
 - **Be kind and ethical.** Avoid using sexist, racist, and homophobic language in your writing and speaking; it will not be tolerated. Ask yourself, "Would I say this to the person's face?" If the answer is no, rewrite. [I'm assuming here that you would not feel comfortable saying rude or harassing things to a person's face. . .]
 - **Be aware** of how your communication may be perceived by others. For example, if you use ALL CAPITAL LETTERS, will folks feel like you are angry or shouting? Or, if you have a dry sense of humor, will your sarcasm be evident or might folks misinterpret your message?
 - **Be forgiving.** We all make communication faux pas, so ask clarifying questions rather than attacking. But if you experience any questionable or outright inappropriate behavior from your colleagues, please let me know.
 - **Respect disagreement.** I expect everyone in the class to respect others' rights to speak, to listen attentively to what is said, and to use discretion and sensitivity when speaking. This does not mean you have to agree with everything said. Debate is a valuable component of a learning community. However, I expect you to be respectful of me and of your colleagues.
 - **Share your knowledge.** As Bill Nye says, “everyone you will ever meet knows something you don't.” You are an expert in something (perhaps many things), so if that expertise becomes relevant, share your knowledge!
 - **Cite your sources.** When you share opinions, it's important to support your claims with sources. This doesn't mean that you must have a citation for everything you post, but providing evidence will strengthen your arguments and will also provide additional resources for your colleagues. But whenever you are using the intellectual property of others, you must always cite your sources.
 - **Help each other.** If you notice a colleague has asked a question or written about a problem, jump in and offer assistance. This is especially true in the Course Lounge discussion board.

I encourage participation and interaction in my lectures and will do my best to create a fantastic learning environment whether it is Face to Face (F2F) class time or via an online meeting platform (Zoom) . However, it is not all up to me. I depend on you, the student, to also take an active role in your education (after all, you pay to be here!) by challenging me with questions and participating. If you are still struggling with the concept after class then get help during my zoom office hours or during office hours or email me to schedule one on zoom meeting .

We will use OAKS extensively in this class ! Everything you need to know about your responsibilities for this course will be posted on OAKS. Throughout the semester I will be posting Lectures , PPT , Voice Threads on OAKS which will help you to understand the topics taught in class .You will submit your assignments via the OAKS dropbox and your grades will be available in the OAKS gradebook.

If you are brand new to OAKS , the folks at Teaching , Learning & Technology have developed an introduction to OAKS course , which you are urged to do . If you have some experience with OAKS , but need more targeted help have a look at these OAKS Tutorials.

How to Take This Course

(with credit & thanks to, and in memory of, Dr. Conseula Francis)

Any course, in any given semester, is a journey, often to a place you haven't been before. You may be super excited about the trip, eager to get going and explore the sites. Or maybe you are here because you were told to take this course. Or maybe you are somewhere in-between. Imagine, if you will, that we're all standing at the base of a mountain. We all have to decide how we're going to climb it, and you alone can decide the manner of your exploration.

<p><u>Day Hiker</u> You're sticking to the trail because you're certain of where it goes. You want the basics - lists, order of processes, details to memorize. There is nothing wrong with this approach, especially if the material is new to you. A successful day hiker will take notes during class, read all related pages in the book after class, and review their notes at least twice a week. A day hiker may do well on quizzes, but they will have to dig a little deeper for exams to really understand the connections between all aspects of the material.</p>	<p><u>Backpacker</u> You're ready to spend a few days on this mountain and you have supplies (already existing knowledge, interest, inclination) to help you. You have a grasp of the basics, and are ready to explore beyond them. Backpackers will hone their note-taking skills in class, read all related pages in the book both before and after class so they can ask questions about anything that is not clear, and really spend time digesting all of the information that is contained in the figures in the textbook. They might even drop in to the professor's office hours from time to time, or send an email, with a question.</p>	<p><u>Trailblazer</u> You are blazing your own way, finding new routes up the mountain and new connections between all aspects of the material, things others may not see. You are passionate about, and interested in, not only the <i>what</i> and the <i>why</i>, but also the <i>how does this connect to other things in the bigger picture?</i> Trailblazers often use different colors when taking notes, and read more in the book than is required, because they really want to understand the whole picture. They study the figures and try to draw them on their own for mastery. They ask questions and spend a lot of time with the material. For trailblazers, this course is part of the expedition to discover all that science has to offer.</p>
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No matter which path you choose, remember that all explorers need to do their best to **limit outside distractions. Yes, life happens, and can divert us from the path, but by putting all of our devices away and really focusing while we are in class, we are giving our brains the gifts of time and focus.**

Course Policies and Requirements

Accommodations

Any student in this class who has a documented disability should speak to me as soon as possible, as well as contact the Center for Disability Services (CDS/SNAP program), located on the first floor of the Lightsey Center, Suite 104, (843) 953-1431, SNAP@cofc.edu

Class Attendance

You are expected to attend all meetings of the class whether Face to Face or online . There will be attendance in the class so that I have record of students attending the class. Students are responsible for **getting their own notes from a classmate** for any class missed. I will be posting all the powerpoints , lectures and Voice threads on OAKS under CONTENT. Exams will be based almost entirely on lectures . **You will not do well in this course if you miss lectures. This material is challenging and requires work on your part for success!**

Assignment

One homework assignment will be assigned during the semester. This assignment is intended to reinforce material covered in class and to encourage critical thinking. It will require you to seek information from sources outside of class and in addition to your textbook. Due date is listed below in the course calendar. All students are expected to turn in their assignment via dropbox on OAKS.

Honor Code

Students are required to adhere to the guidelines outlined by the Honor Board in the Student Handbook . **This includes lying, which will not be tolerated in this course.** All work that you turn in for this course (whether for assignments, quizzes, or exams) must be **your own.** Any form of plagiarism (intentional and unintentional), cheating, or presenting someone else's work as one's own will be treated as a serious academic transgression and will be communicated accordingly by the instructor as an honor code violation to the Division of Student Affairs. Be especially cautious of plagiarism when using Internet sources. **Cheating, attempted cheating, or plagiarism will result in a grade of zero on that assignment, quiz or exam and may result in a final overall grade of F or XXF (failure due to academic dishonesty) for the course.**

Quizzes

Several short quizzes will be given throughout the semester online dates are mentioned in the syllabus. You will be given 10 min for 10 multiple choice questions. They are intended to assist students in keeping up with the large amount of information in this course. **It is the student's responsibility to keep up with due dates and times! Your lowest quiz score will be dropped in the final grade calculation.** A missed quiz will result in a 0 for that quiz, unless the student provides a valid and documented absence memo (through the Absence Memo Office – see below). Acceptable excuses include serious illness, personal tragedy or extreme circumstances beyond the student's control. **If you have a quiz excused, all of your remaining quiz scores will count toward your final grade (none will be dropped). No more than 2 quizzes may be excused.**

Exams

In this course, there are 5 regular exams scheduled during the semester online (see calendar below for dates) lowest exam grade will be dropped and 1 cumulative final exam scheduled during the final examination period online. **There will be no make-up exams.** Anyone who misses an exam will receive a 0, unless the student provides a valid and documented absence memo (through the Absence Memo Office, 67 George St., (843) 953-3390, victimservices.cofc.edu/absence-memo/index.php, absencememo@cofc.edu) for missing a scheduled exam. Acceptable excuses include serious illness, personal tragedy or extreme circumstances

beyond the student's control. If you have any conflicts with the scheduled exams, you must see me ahead of time, well before the exam date. After receiving one excused exam, a student will be in danger of receiving a grade of Incomplete for the course if any more exams are missed.

Grading

The quizzes will count for a total of 15% of the lecture portion of your final grade. The assignment will count for 10% of the lecture portion of your final grade. The 4 regular exams will count for a total of 55% of the lecture portion of your final grade. The cumulative final exam will count for 20% of the lecture portion of your final grade. Grade calculation formula (try for yourself in an Excel spreadsheet):

$[(\text{Quiz avg.}) \times 0.15] + [(\text{Assign. grade}) \times 0.10] + [(\text{Exam avg.}) \times 0.55] + [(\text{Final exam score}) \times 0.20] = \text{Lecture portion of your final grade (75\%)}$. The grade that you earn in your Bio. 101 lab will count for the remaining 25% of your final grade for Bio. 101.

Students who have a SOLID "A" average (93 or higher) at the end of the semester FOR THE LECTURE PORTION OF THE COURSE can opt to be exempt from the final exam, BUT you must talk to me to confirm; no show = 0.

Letter grades will be determined by the following breakdown:

≥93% = **A** 90-92 = **A-** 87-89 = **B+** 83-86 = **B** 80-82 = **B-** 77-79 = **C+** 73-76 = **C**
70-72 = **C-** 67-69 = **D+** 63-66 = **D** 60-62 = **D-** ≤59 = **F** 0 due to acad. dishonesty = **XXF**

Please teach yourself how to check on your grade in this course on OAKS, and follow along during the semester. Any errors can be brought to my attention, and are much easier to fix the sooner they are detected!

My Expectations of Students in my class:

1. **TURN OFF** all cell phones, pagers, iPods, iPads, tablets, laptops and anything with alarms before coming into my class **AND PUT THEM AWAY**. If you forget to do so you may be asked to leave and not to return that class period. If you have a legitimate need to use a laptop, please see me to discuss.
2. **DO NOT TALK OR TEXT** (your phone should be off and put away anyway) WHEN I AM LECTURING. I am trying to do my job and others are trying to learn – please be courteous and pay attention! If you have a question, please ask me – I love questions from students!
3. This is a large class, and it will take me some time to learn your names. However, I have an excellent memory and I can see everyone, even in such a large lecture hall, so please stay awake, participate and be attentive. **Start behaving now like the student you will want me to write that stellar recommendation letter about!**

COURSE CALENDAR

(lecture schedule is tentative – I will notify class of any changes – but exam dates are firm!)

Date	LECTURE TOPIC	Chapter
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August		
W 26	Welcome, Introduction	
F 28	Cell , Cell Theory	4.1 , 4.2
M 31 <i>Quiz 1</i>	Eukaryotic cells	4.5
September W 2	Parts of Eukaryotic cells	4.6, 4.7, 4.8
F 4	More parts of Eukaryotic cells	4.9
M 7 <i>Quiz 2</i>	Cell memberane ,outside of cell memberane	<u>4.3</u>
W 9	EXAM 1	
F 11	Cellular Connections	4.10
M14 <i>Quiz 3</i>	Lifes Chemical Basis , Atoms bonding (only covalent bonds)	2.1 , 2.2 ,2.3
W16	Hydrogen bonding and Water (<i>In classroom</i>)	2.4
F 18	Ions , Acids and Bases (Zoom online)	2.5
M 21 <i>Quiz 4</i>	Molecules of life (Origin of organic molecules)	3.1 , 18.1
W 23	Organic molecules , functional groups, Carbohydrates	3.1 , 3.2
F 25	Lipids (Zoom online)	3.3
M 28	**EXAM 2**	
W 30	Proteins	3.4
October F 2	Sickle cell disease, Nucleic acids and Chromosomes (Zoom online)	Pg 156-157 , 3.5 , 3.6
M 5 <i>Quiz 5</i>	Cell cycle and Cancer	11.1
W 7	Eukaryotic cell cycle , Eukaryotic cell division (Mitosis)	11.2 , 11.3, 11.4, 11.5 , 11.6
F 9	Mitosis <i>ACTIVITY</i> and worksheets	
M 12 <i>Quiz 6</i>	Energy, Enzymes	5.1, 5.2, 5.3
W 14	**EXAM 3**	

F 16	Coenzymes and Cofactors (Zoom online)	
M 19 <i>Quiz 7</i>	Metabolic Pathways	
W 21	Photosynthesis (Light dependent Reaction)	6.1,6.2,6.3
F 23	Photosynthesis (Light Independent Reaction) (Zoom online)	6.4
M 26 <i>Quiz 8</i>	Respiration (Aerobic Respiration) - Glycolysis	7.1,7.3
W 28	Krebs Cycle	7.3
November M 2	Exam 4 & Assignment due	
W 4	Fermentation	7.5
F 6	Chromosome terminology and background for meiosis (Zoom online)	8.3 , 12.1
M 9 <i>Quiz 9</i>	Meiosis ; Overveiw and details	12.2 , 12.3, 12.4
W 11	Meiosis <i>ACTIVITY</i> and worksheet	
F 13	Genetics Inheritance and Punnett square (Zoom online)	13.1 , 13.2
M16 <i>Quiz10</i>	Punnett square practice and other pattern of dominance	13.4
W 18	Double character crosses , special dihybrid crosses	13.3 , 13.4
F 20	Epistasis , Epigenetics , Continuous Variation (Zoom online)	13.5 , 13.6
M23 <i>Quiz11</i>	Human inheritance patterns and pedigrees	14.1,14.2,14.3,14.5
M 30	EXAM 5	
December W2 & F4	Revision for Final Exam	

7 Dec	Reading day starts (No classes)	
Wednesday Dec. 9	FINAL CUMULATIVE EXAM (ONLINE) (10:30 PM- 12:30PM)	

**** Please note: as stated in the Undergraduate Catalog (all online: catalog.cofc.edu/content.php?catoid=3&navoid=130&hl=%22exams%22&returnto=search#final-examinations):**

Examinations **must** be taken at the time scheduled, **except** when:

1. Two or more exams are scheduled *simultaneously*.
2. Legitimate **AND** documentable extenuating circumstances prevent the student from completing the examination at the scheduled time (e.g., burial services for an immediate family member) *Note: Forms for requesting permission to reschedule one exam may be found on the Student Academic Forms channel on the Academic Services tab on MyCharleston. Written permission of the instructor and all relevant signatures must be obtained at least 24 hours prior to the scheduled time for the final examination.*

Make it a habit to always check out your final exam schedules: registrar.cofc.edu/pdf/exam-schedule-fall2020.pdf

**CONCEPTS AND APPLICATIONS IN BIOLOGY I & II
BIOL 101 & 101L/BIOL 102 & 102L
Department: Biology**

Learning Goals & Objectives

This general education science course provides a background for understanding and evaluating contemporary topics in biology and societal/environmental issues. Students develop a general understanding of core concepts and develop the critical competencies that form the bases for the practice of science and use of scientific knowledge.

Core Concepts

This 2-semester course sequence in general biology addresses fundamental principles in biology which broadly include:

- **Evolution: The diversity of life evolved over time by processes of mutation, selection, and genetic change. The theory of evolution by natural selection allows scientists to understand patterns, processes, and relationships that characterize the diversity of life.**
- **Structure and Function: Basic units of structure define the function of all living things. Structural complexity, together with the information it provides, is built upon combinations of subunits that drive increasingly diverse and dynamic physiological responses in living organisms. Fundamental structural units and molecular and cellular processes are conserved through evolution and yield the extraordinary diversity of biological systems seen today.**

- **Information flow, exchange and storage:** The growth and behavior of organisms are activated through the expression of genetic information at different levels of biological organization and depend on specific interactions and information transfer.
- **Pathways and transformation of energy and matter:** Biological systems grow and change by processes based upon chemical transformation pathways and are governed by the laws of thermodynamic and will be explored to understand how living systems operate, how they maintain orderly structure and function, and how physical and chemical processes underlie processes at the cellular level (i.e. metabolic pathways, membrane dynamics), organismal level (i.e. homeostasis) and ecosystem level (i.e. nutrient cycling).
- **Biological systems:** Living systems are interconnected and interacting and biological phenomena are the result of emergent properties at all levels of organization, from molecules to ecosystems to social systems. The course will explore the dynamic interactions of components at one level of biological organization to the functional properties that emerge at higher organizational levels.

These ideas are explored from the perspective of the following topics in each course:

BIOL 101 & 101L

- **Chemical and Physical Properties of Life**
- **Evolution as a unifying principle in biology**
- **Cell Form & Function**
- **Energetics and Metabolism**
- **The Cell Cycle**
- **Meiosis and Sexual Reproduction**
- **Mitosis and Cell Reproduction**
- **Mendelian Genetics**
- **Patterns of Inherited Traits**
- **Human Inheritance**
- **The Molecular Basis of Inheritance**
- **DNA and protein production**
- **Regulation of gene expression**
- **Biotechnology**

BIOL 102 & 102 L

- **Evolutionary Processes**
- **Origins of Life**
- **Biodiversity**
- **Viruses, Bacteria and Archaeans**
- **"Protist" Lineages**
- **Plants**
- **Fungi**
- **Animals**
- **Plant Form & Function**
- **Animal Form & Function**
- **Principles of Ecology**

Core Competencies

- **Nature of Scientific Knowledge**

- Understand the intellectual standards used by scientists to establish the validity of knowledge, evidence, and decisions about hypothesis & theory acceptance? These standards include: 1) science relies on external and naturalistic observations, and not internal convictions. 2) scientific knowledge is based on the outcome of the testing of hypotheses and theories that are under constant scrutiny and subject to revision based on new observations 3) the validity of scientifically generated knowledge is established by the community of scientists through peer review and open publication of work.

Understand that new ideas in science are limited by the context in which they are conceived; are often rejected by the scientific establishment; sometimes spring from unexpected findings; and usually grow slowly, through contribution

- Understand that science operates in the real world as defined by the laws of chemistry and physics.

- Understand the differences between and relations among a scientific theory, hypothesis, fact, law, & opinion.

- Understand the differences between science and technology but also their interrelations.

- Understand the dynamic (tentative) nature of science.

- **Scientific Methods of Discovery**

- [1] Understand the methods scientists use to understand the natural world (observing; questioning; formulating testable deductive hypotheses; controlled experimentation when possible; observing a wide range of natural occurrences and discerning (inducing) patterns.)

- Apply physical/natural principles to analyze and solve problems.

- **Developing a Scientific Attitude**

- Develop habits of mind that foster interdisciplinary and integrative thinking (within biology; between biology and other sciences; between science and other disciplines)

- Develop an appreciation for the scientific attitude - a basic curiosity about nature and how it works.

- **Developing scientific analysis and communication skills**

- Develop quantitative reasoning skills (quantitatively expressing the results of scientific investigations, or patterns in nature and using knowledge of biological concepts to explain quantitatively-expressed data or patterns).

- Understand the probabilistic nature of science and the use/application of inferential statistics to test hypotheses.

- Develop scientific information literacy (library, internet, databases etc...); finding and evaluating the validity of science-related information.

- Communicate scientific knowledge, arguments, ideas in a variety of different contexts (scientific, social, cultural) and utilizing a variety of different media (scientific articles, policy statements, editorials, oral presentations etc...).
- Develop cooperative problem-solving skills (working effectively in teams), but also habits of mind and skills that foster autonomous learning.
- Develop an appreciation for the impact of science on society.
- Develop an appreciation of humans as a part of the biosphere and the [2]impact of biological science on contemporary societal/environmental concerns.
- Knowledge of the history of the biological sciences and the influences of politics, culture, religion, race, and gender on the scientific endeavor.

Signature assignments for measuring learning outcomes

Learning Outcome 1: Students apply physical/natural principles to analyze and solve problems. This learning outcome is assessed using the poster (or scientific article) generated in Biology 102 lab as part of the multi-week student-directed independent research project. In this project students use ecological data they collect (or which has been collected in actual research investigations) to test an ecological hypothesis of their choosing. This multi-week project begins with students becoming experts in various areas of ecological sampling. Students, working in small research teams, decide on a question they would like to explore. Teams then develop a research proposal to test their hypothesis. Students collect (or use already collected data), summarize and analyze the data, and draw conclusions.

Learning Outcome #2 - Students demonstrate an understanding of the impact that science has on society.

BIOL 102 lab students produce a written document (examples - policy statement, article, stakeholder professional letter or poster) which requires them to research and apply biological knowledge or evidence to defend or critique a proposed solution to a biology-related societal issue. Although the choice of the specific issue or proposed solution is course-section specific, some examples of potential issues include

- exploring environmental/health impacts of genetically modified organisms
- the epidemic of diabetes in the United States
- solutions for mitigating global climate change

Textbook: The text book (Biology: Concepts and Applications (currently - 10th Ed.) by Starr, Evers & Starr.

[1] This learning goal is measured as part of the general education assessment. The specific learning outcome to be measured is: *Students apply physical/natural principles to analyze and solve problems.*

[2] This learning goal is measured as part of the general education assessment. The specific learning outcome to be measured is: *Students demonstrate an understanding of the impact that science has on society.*

