BIO 110: Principles of Biology

Fall 2018

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WELCOME

Congratulations -you made it to college and to your first biology course! This is an amazing accomplishment and you should be proud that you are here. I am excited that I have the privilege to work with you as we start this journey together. I love biology (*perhaps a bit too much*) and can't wait to share with you how fascinating the study of living things really is. My goal for you is that by the end of this course you will be a successful college student and well on your way to becoming a great scientist. I am here to help so please let me know what I can do on my end to make this goal a reality.

COURSE OVERVIEW

This course will meet three days a week in the lecture room and you will meet once a week in your lab sections. The lecture material is organized into four units where we will start with the smallest units (atoms) and move up to larger functioning units (cells) as the semester progresses. During the lecture time, you will not just sit and passively listen. There will be clicker questions to answer, topics to discuss, and problems to solve in our case studies. This means that you need to do some work before class to be ready to participate. You will need to read the chapter and answer the homework questions before we cover that topic in class so that you know where we are headed for the day. Don't worry, the homework is based on effort and I don't expect you to already know the material. I just want you to come to class with a little knowledge that we can then expand on and apply during class time.

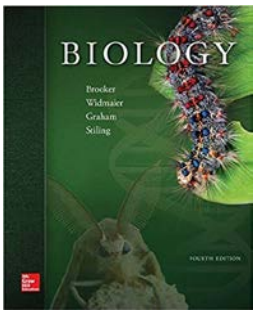
COURSE PURPOSE

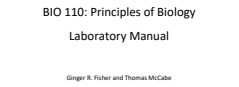
Have you ever thought about how all the parts of a cell work together? Did you ever wonder how DNA makes you who you are? Have you ever thought about what scientists *really* do? This course will give you insight not only into the basics of biology but also allow you the opportunity to design your own research project and start the process of becoming a scientist. By the end of this course you will be able to (1) Describe and apply the basic principles of the discipline, (2) Discuss and demonstrate how scientists solve problems in the discipline, (3) Evaluate the validity of scientific arguments, (4) Collect, organize and interpret data and (5) Demonstrate skills in observation. These are all skills that will help you in future coursework and in your future careers. Although it may seem like a lot at the beginning, I have no doubt that by the end of the course you will be able to do all of these things and be ready to continue your scientific adventures.

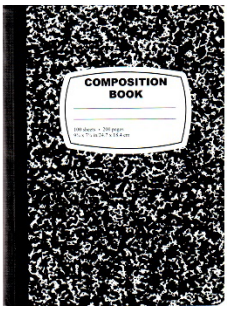
Big Journeys Begin with Small Steps

COURSE MATERIALS

TEXTBOOK *Biology* by Brooker, 4th ed. (choose ONE option)	CLICKER (choose ONE option)	LAB MANUAL	COMPOSITION NOTEBOOK
Option 1 (recommended) Ebook: Purchase the electronic version of the book and the access code for the Connect homework directly through Canvas at the beginning of the semester. To do this, click on the first homework link in the Canvas site for the BIO 110 course and enter your credit card information there. Option 2: Purchase the loose leaf version from the UNC bookstore AND the access code for the Connect homework. You will then enter your code on Canvas once the semester begins.	Option 1: Purchase an iClicker with a 5 year mobile access card. This is recommended for Biology majors who will be using the clickers in multiple classes during your time at UNC. These are available at the UNC bookstore. Option 2: Purchase an iClicker with a 2 year mobile access card. Please check with your major department to see if you will be using clickers in the upper level courses. If not, then this is the recommended option. These are available at the UNC bookstore.	The laboratory manual for this course will be provided for you on Canvas. However, you MUST print out the entire lab manual and bring it to your first laboratory session. I recommend that you use a service such as Fed-Ex Kinko's or UPS and have it printed for you.	This is a blank notebook that you will use as your lab notebook when conducting your experiments. It can be purchased at the UNC bookstore or any office supply store.







CANVAS

For this course, I have placed all course materials on Canvas (https://www.unco.edu/canvas/), which is UNC's learning management system. Here you can find all of the PowerPoints for lecture, the lab manual, links to the homework and everything else. Please check this site regularly as this is my primary means of communication with you.

ASSIGNMENTS

Exams

Each of the first three exams will cover approximately 1/4 of the course material presented in lecture and in the textbook. The final exam will include both the last 1/4 of the material presented as well a comprehensive review of all material covered throughout the semester. Essentially, the final exam covers the entire semester. All exams are in multiple choice format so you need to bring a pencil and eraser on exam days. You will also need to bring a picture ID to class so that I know who you are. **The date for the final exam is Friday, December 7th from 1:30-4:00PM.** The final exam date is set by the university and you will need to be there on that day at that time. The other exam dates are listed in the schedule and these will not change. This allows you to plan your study time accordingly. For the first three exams, I will drop the lowest exam grade. This allows you to recover from a less than stellar performance on an exam or allows you miss an exam if you have an emergency. If you have an emergency, you will be given a zero for the exam and then this will become your lowest grade and will be dropped. For this reason, there are no make-up exams for this course, I simply drop the grade you missed.

Homework

At the beginning of each new chapter that we cover in class, a homework assignment will be provided on Canvas. This assignment is designed to help you test your understanding, identify knowledge gaps, and prepare you for learning the material in class. You will need to complete and submit this assignment BEFORE you come to class on the day we begin that new chapter. The due dates for all of these are listed in the schedule and the links to the homework are in Canvas. If you miss an assignment, you can still review the material to help you learn, but the grade will remain a zero. To access the homework, click on the link for the homework assignment in Canvas. This will take you to a site to register and add your UNC email address. You will then be asked to provide the code that you purchased in the bookstore. If you have not yet purchased a code, you may do so at this time. One you have access, answer the practice questions provided until you have reached 100% completion. If you have technical issues with the homework assignment, please call the McGraw Hill technical support at 1-800-331-5094. They will work with you and provide you with a case number. In order for me to help you with any technical issues, I first need that case number.

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McGraw-Hill Education

Clickers

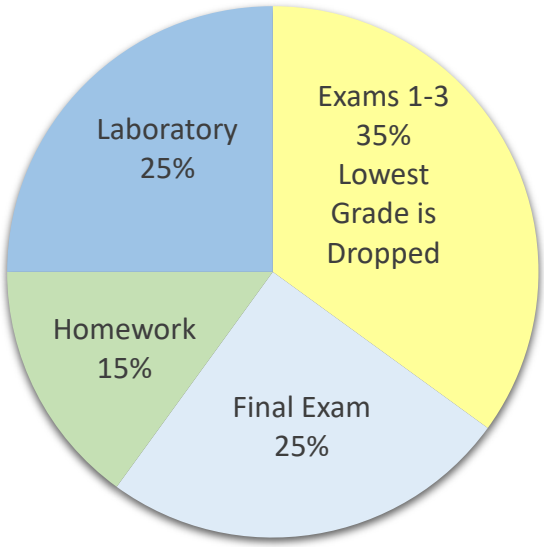
The clickers that we use will enable you to answer questions during class, participate in the case studies and earn extra credit! There will be a set number of clicker questions throughout the semester, and you will be given up to 5 extra credit points on the final exam based on the total number of questions you ask. For example, if you answer 100% of the questions, you will get 5 points. If you answer 85% of the questions, you will get 4.25 points. Once you purchase your clicker, you need to register it through Canvas. To do this, go to our Canvas course, click on the Assignments Button, and "Register Your Clicker". All clickers must be registered by the August 31st to be eligible for the extra credit points. You will not be able to use the iClicker software app for your phone due to the limited wifi and cellular capacity in the classroom. Please note that bringing your friend's clicker to class so that they get credit when they are absent is considered cheating and will result in both of you earning a zero for the course.

Laboratory

I am incredibly excited about the laboratory in this course! No longer will you just follow a series of instructions to get a specific result that you already know should occur (that is NOT real science). Instead, you will be asking questions that no one knows the answer to, designing experiments to answer this question, collecting and analyzing the results and drawing conclusions. You will get to do REAL science!! You will be given a model organism, the planktonic copepod *Tigriopus californicus,* and your lab group will come up with your own questions and devise a way to answer them. Rest assured that you will have lots of guidance from your lab instructor as you begin your first foray into real science. Your lab session meets once a week with the exception of the weeks of September 3rd and November 20th. You will be given a separate syllabus for the lab, and will be expected to follow all guidelines listed therein.

GRADING

Grades in the course are based on a weighted system rather than total points. The weights can be seen in the chart below. Your current grade will always be posted in Canvas so you know where you stand at any time.



Letter grades will be assigned as follows:

90-100%	A
80-89%	B
70-79%	C
60-69%	D
<60%	F

STUDENT SUPPORT

What should I do to be successful in this course?

- Recognize that this course will take a large amount of time. You will need to do readings, homework, attend class and lab, and study. It is expected that you will be spending 2-3 hours outside of class for every hour in class. College truly is a full time job.
- Study often and regularly. One of the biggest challenges will be how much material we cover and how quickly we do so. The solution to this is to keep up with the notes and study daily. Pretend that we have a test every Monday and study accordingly. If you wait until a few days before the exam to start studying, you will be overwhelmed by the amount of material and less likely to be successful.
- Be engaged. Come to class ready to learn, participate, take notes and discuss concepts. Leave that cell phone in your bag!
- Ask questions. Ask lots of people lots of questions. Ask those sitting near you, your lab partners, your lab instructor, tutors, supplemental instructors, ME!!!!

BEFORE CLASS	DURING CLASS	AFTER CLASS
• Read the chapter • Do the homework • Note difficult concepts • Print out the lectures	• Stay engaged • Take notes • Ask questions • Discuss Clicker questions	• Recopy notes in your own words • Find answers to questions • Study as if there was a weekly quiz

What should I do if I need help?

- Come see me. I have office hours which are specifically set aside as a time when I can meet with you. Feel free to stop by to go over exams, ask questions, chat about biology, etc. I can also meet with you at other times, but I do have quite a few meetings and classes, so email me ahead of time to find a time that work for both of us. I didn't learn how useful it was to go to office hours until I was in graduate school, so learn from my mistakes and come see me!
- Ask your lab instructor. These individuals are wonderful sources of knowledge, not only about biology but also about being a student. Remember that they were once in your shoes and were able to be successful, so learn from them.
- UNC offers FREE tutoring for students in this course. Take advantage of it by going to the tutoring center (Michener L-149) and sign up for a time.
- UNC also offers FREE Supplemental Instruction (SI) sessions for this course. These are group sessions to help review the material and are led by a student who was successful in this very course. Times/locations for these sessions will be posted on Canvas.

POLICIES

Academic Integrity: As members of a scholarly community dedicated to healthy intellectual development, students and faculty are expected to share the responsibility for maintaining high standards of honesty and integrity in their academic work. All material for this course must be your work and no one else's. Cheating or plagiarism in any form will not be tolerated. This includes, but is not limited to, copying someone else's work, clicking in for an absent student, and using banned material while taking exams. The penalty for cheating or plagiarism is a zero for the course. UNC's policies and recommendations for academic misconduct will be followed. For additional information, please see the Student Code of Conduct.

Honor Code: all members of the University of Northern Colorado community are entrusted with the responsibility to uphold and promote five fundamental values: Honesty, Trust, Respect, Fairness, and Responsibility. These core elements foster an atmosphere, inside and outside of the classroom, which serves as a foundation and guides the UNC community's academic, professional, and personal growth. Endorsement of these core elements by students, faculty, staff, administration, and trustees strengthens the integrity and value of our academic climate.

Disabilities: Disabilities are not a reflection of your intelligence or who you are, they are a reflection of how your brain works. If you know or think that you have any learning or physical disabilities, please contact our Disability Support services. This will help you gain access to resources and also let me know how I can best accommodate your needs.

Disability Resources: It is the policy and practice of the University of Northern Colorado to create inclusive learning environments. If there are aspects of the instruction or design of this course that present barriers to your inclusion or to an accurate assessment of your achievement (e.g. time-limited exams, inaccessible web content, use of videos without captions), please communicate this with your professor and contact Disability Support Services (DSS) to request accommodations. Office: (970) 351-2289, Michener Library L-80. Students can learn more about the accommodation process at http://www.unco.edu/disability-support-services/

Portable electronic devices: Please extend courtesy to me and fellow students by putting away your cell phones during class. They are a distraction to you and other students and prevent you from being fully engaged in class. Please step out of the classroom if you need to receive a call during class.

Preferred pronouns/methods of address: If you have a nickname, or a preferred pronoun that is different from what I may assume, please let me know, and I will do my best to follow your preferences. You may address me as Professor Fisher, or Dr. Fisher (preferred pronouns: she, her).

Course Description: Welcome to *a study of life*! This course examines biological principles from cells to communities, especially structure and function. You will explore genetics, metabolism, physiology, and homeostasis. This course will help build a foundation of knowledge about how all living organisms from a simple yeast cell to a gigantic blue whale live and survive. Although this course fulfills one of the general education requirements, it is not recommended for non-science majors.

SCHEDULE

Wk	Day	Date	Lecture Topic	Chpt	HW due	Lab Topic
		THEME 1	**INTRODUCTION AND MOLECULES**			
1	M	20-Aug	Introduction - what is life?			Scientific Method
	W	22-Aug	Studying Life	1		
	F	24-Aug	Case Study Science Methods		chpt 1	
2	M	27-Aug	Chemistry of Life	2	chpt 2	Lit Review and Critique
	W	29-Aug	Small Molecules			
	F	31-Aug	Case Study - Too Much Aspirin			
3	M	3-Sep	LABOR DAY: NO CLASS			NO LABS THIS WEEK
	W	5-Sep	Carbohydrates and Lipids	3	chpt 3	
	F	7-Sep	Proteins and Nucleic Acids			
4	M	10-Sep	Case Study - Brains and Broncos			Using the Microscope
	W	12-Sep	Chemical Evolution	22	chpt 22	
	F	14-Sep	EXAM 1			
		THEME 2	**CELLS AND ENERGY**			
5	M	17-Sep	Cells - types and principles	4	chpt 4	Dilutions and Standard Curve
	W	19-Sep	Cells - organelles			
	F	21-Sep	Cell Structure and Disease			
6	M	24-Sep	Case Study- Infection Diagnosis			Algae
	W	26-Sep	Membranes Structure and Chemistry	5	chpt 5	
	F	28-Sep	Membrane Synthesis and Transport			
7	M	1-Oct	Case Study- Ecstacy			Graphing and Data Analysis
	W	3-Oct	Thermodynamics and Enzymes	6	chpt 6	
	F	5-Oct	Enzyme Control and Pathways			
8	M	8-Oct	Case Study - Fire and Fish			Research Projects
	W	10-Oct	Review - Exam Prep			
	F	12-Oct	EXAM 2			
		THEME 3	**CELL PROCESSES**			
9	M	15-Oct	Cellular Respiration	7	chpt 7	Research Projects
	W	17-Oct	Case Study - Metabolic Murder			
	F	19-Oct	Anaerobic Respiration and Fermentation			
10	M	22-Oct	Case Study - Fun in Fermentation			Research Projects
	W	24-Oct	Photosynthesis I	8	chpt 8	
	F	26-Oct	Case Study - Photosynthesis			
11	M	29-Oct	Cell Communication	9	chpt 9	Research Projects
	W	31-Oct	Case Study - THC and Memory			
	F	2-Nov	Nucleic Acid Structure	11	chpt 11	
12	M	5-Nov	DNA Replication			Research Projects
	W	7-Nov	Case Study - Dracula			
	F	9-Nov	EXAM 3			
		THEME 4	**GENETICS**			
13	M	12-Nov	Transcription	12	chpt 12	Research Projects
	W	14-Nov	Translation			
	F	16-Nov	Gene Regulation	13	chpt 13	
14	M	19-Nov	Case Study - Schizophrenia			NO LABS THIS WEEK
	W	21-Nov	THANKSGIVING: NO CLASS			
	F	23-Nov	THANKSGIVING: NO CLASS			
15	M	26-Nov	Mitosis and Meiosis	15	chpt 15	Presentations
	W	28-Nov	Simple Mendelian Inheritance	16	chpt 16	
	F	30-Nov	Other forms of inheritance and pedigrees	17		
16	**T**	**7-Dec**	**FINAL EXAM 1:30-4:00PM FRIDAY**			

INSTITUTIONAL OUTCOMES

LAC
This course satisfies 4 credits of LAC Area 6

LAC6 Student Learning Outcomes:

1. Explain the fundamental concepts within the scientific field of study at the introductory level.
2. Explain relevance of the science content to real world topics affecting humanity.
3. Evaluate the quality of evidence in a scientific argument
4. Select or Develop a Design Process. a. Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.
5. Analyze and Interpret Evidence. a. Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus.
6. Analyze and Interpret Evidence. b. Utilize multiple representations to interpret the data.
7. Draw Conclusions. a. State a conclusion based on findings.
8. Interpret Information. a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
9. Represent Information. a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).

GT Pathways Content Criteria:

1. Develop foundational knowledge in specific field(s) of science.
2. Develop an understanding of the nature and process of science.
3. Demonstrate the ability to use scientific methodologies.
4. Examine quantitative approaches to study natural phenomena.
5. Perform hands-on activities with demonstration and simulation components playing a secondary role.
6. Engage in inquiry-based activities.
7. Demonstrate the ability to use the scientific method.
8. Obtain and interpret data, and communicate the results of inquiry.
9. Demonstrate proper technique and safe practices.

The Colorado Commission on Higher Education has approved BIO 110 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT-SC1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to http://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html