

BIO120

Principles of Biology I

Draft Course Syllabus

Term Year

Class Time	Tue, 1-hour period (Lecture) Thu, 1-hour period (Lecture) Fri, 3-hour period (Lab)
Class Location	TBD
Instructor	David Murray-Stoker
Office Location	TBD
Office Hours	TBD (Hybrid)
Email Address	dstoker92@gmail.com

Course Overview

You will learn about the chemical foundations of life, cell structure and function, respiration, photosynthesis, mitosis, meiosis, and the fundamentals of genetics. You will apply your knowledge to case studies in lecture and laboratory activities that can be applied to real-world situations. Through the laboratory assignments, you will practice and develop scientific writing and be engaged in the process of science. This course is the first in the principles of biology sequences for majors.

Learning Objectives

As you participate and engage in the course, you will be able to:

- Describe the chemical foundations of biology, such as atoms, ions, and molecules.
- Understand the structure and function of animal and plant cells.
- Diagram the processes of respiration and photosynthesis.
- Compare and contrast mitosis and meiosis.
- Explain how information is transferred through genes.
- Express how genetic information stored in organisms can change.
- Develop scientific literacy and the ability to communicate information to others.
- Reflect on your learning and develop a growth mindset.

Coursework

You should expect to complete 10-14 hours of study and work each week for this course, including time spent in lecture and lab. In other words, there will be ~5-9 hours of work outside of lectures and computer labs for you to complete the readings and course assignments. The course schedule is at the end of the syllabus, but the table below highlights the assignments and their weight towards your final grade.

Type	Description	Due Date	Weight
Lecture Quizzes	In-class lecture quizzes and activities	Ongoing	15%
Lecture Reflections	Directed reflections (weekly)	TBD	10%
Laboratory Assignments	Participation and engagement in lab activities	TBD	30%
Term Tests	Take-home term tests covering specific units (4 total)	TBD	30%
Group Term Tests	Take-home group tests covering specific units (4 total)	TBD	15%
		Total	100%

Notes on Coursework

Lecture Quizzes (15%): We will use lecture quizzes to document progress through the learning process. Quizzes be evaluated for completeness – not correctness – and there will be the opportunity to learn the ‘correct’ answer in class, either from your peers, your instructor, or your own reflection. Quizzes will be administered using an iClicker device.

Reflections (10%): You will complete weekly reflections on recent course topics and to monitor your learning process. These reflections will have directed prompts to guide your reflection, but there will also be an open field for you to expand on any component of the lecture content. I will also emphasize metacognition in these reflections, or having you learn about your learning process: what works, what doesn’t work, how to study/learn more effectively. Reflections will likely be around 200-300 words (more if desired). Reflections will be submitted through the course website.

Laboratory Assignments (30%): Labs get you involved in the scientific process and applying what you have learned in lecture to inquiry-based assignments. The lab is writing intensive, as you will be taking notes for each lab assignment as you design, test, and report on your own experiments. Some labs will require written homework to be completed outside of the lab period.

Term Tests (7.5% each, 30% total): The 4 take-home term tests will cover specific units and be due 72 hours after being released through the course website. The term tests will consist of case study evaluations and short answer/essay questions. It will also include directed reflection questions. The term tests will be submitted through the course website. The term test will be open book, but you are encouraged to take notes so you can develop knowledge recall and application in preparation for the final exam and when you apply your learning and understanding of biology to your everyday life.

Group Term Tests (3.75% each, 15% total): Science is a collaborative enterprise, like many careers inside and outside of science. To develop your ability to work effectively with others, there will also be 4 group term tests. Each of the group take-home term tests will be assigned after you received feedback on your individual term test. If you had difficulty with a question, the group test gives you the opportunity to clarify any questions or confusions that remain with your group members. Working as a group can actually help you better learn the material, because explaining a process or concept to another person also helps you better apply your learning.

Working as a group means each member needs to come prepared and willing to contribute to the group. To help with the group work, each group will set a community agreement where expected conduct and contributions will be determined. If there are any issues in your group at any point during the semester, please contact me so we can resolve any issues and move forward productively.

Course Resources

Chapter Readings: We will be using [OpenStax Biology](#), which is a free, open-access textbook.

Technology: You will need access to a device (e.g., laptop, tablet) with internet access for lecture activities, email correspondence, using the course website, and completing assignments. You are also encouraged to use a laptop or equivalent device with Microsoft Office installed (software subscription included with your university email) or use Google Docs to complete the coursework. **If you do not have reliable access to the internet and/or a suitable device, please contact me so we can find a positive solution.**

Evaluation

We will be using the ‘ungrading’ approach to all evaluations rather than traditional grading systems. Evaluation and assessment will be more of a conversation between you and me, and we are able to do this through a combination of feedback and reflection. Below I will expand on the evaluation for each type of coursework and how ungrading will be applied.

Lecture Quizzes (15%): Lecture quizzes will be submitted via iClicker devices and evaluated for completion. If you attend the lecture and complete the quiz, you will receive credit.

Reflections (10%): Lecture reflections are designed for you to articulate what you learned from the lecture and lab. I will provide comments and feedback on each reflection, offering advice, clarification, and encouragement as appropriate. I will also be using these reflections to help identify common challenges, misconceptions, or misunderstandings, so it is important that reflections also discuss challenging topics. Reflections will be evaluated for addressing the directed reflection prompts.

Laboratory Assignments (30%): Each lab will get you involved in the scientific process. Assignments will consist of worksheets that are due at the end of each lab section (unless otherwise noted) and will be marked for completion. I will evaluate worksheets and provide any necessary feedback, and worksheets will be returned to you within 1 week.

Term Tests (7.5% each, 30% total): The 4 take-home term tests will cover specific units and be due 72 hours after being released through the course website. The term test will consist of case study evaluations and short answer/essay questions. It will also include directed reflection questions. The term test will be submitted through the course website. There is no cumulative final exam, but term tests will require you to understand and apply what you learned in previous units to new contexts. All term tests will be open book, but you are encouraged to take notes so you can develop knowledge recall and application in preparation for the final exam and when you apply your learning and understanding of biology to your everyday life. I will return each term test to you with feedback, noting areas where you did well and pointing out areas for improvement and growth.

Group Term Tests (3.75% each, 15% total): The 4 take-home group term tests will cover specific units and be due 5 days after being released through the course website (extra time to allow your group to meet while accommodating other commitments). The group term tests will consist of case study evaluations and short answer/essay questions that expand on questions from the individual term tests. There will be a space at the end of each term test for group members to note their contributions. The term tests will be submitted through the course website. The term test will be open book, but you are encouraged to take notes so you can develop knowledge recall and application in preparation for the final exam and when you apply your learning and understanding of biology to your everyday life. Similar to the individual term tests, I will return group term tests with feedback that indicates areas where you did well and where there is room for improvement and growth.

Final ‘Grade’: At the end of the semester, you will use all of your completed work and learning to assign yourself a letter grade. You will write a narrative statement to discuss your learning and support your chosen grade. You should not expect to receive a grade on any assignments, but you should expect to conduct frequent self-reflection and receive feedback from me throughout the course. My goal is to help you learn and grow without fear of making mistakes or being penalized as you try something new.

As the course instructor, I reserve the right to change the grade you assigned. Based on previous experience, this typically means I increase student grades. I will notify you of any grade increase and

provide my reasoning. In the unlikely situation where I feel the grade you assigned is too high, we will arrange a meeting to discuss our positions and come to an agreement.

Teaching Methods

BIO120 is an active learning class where you are part of the learning process. You are expected to come to class ready to engage in the material by participating in lecture activities, collaborating with your peers, and applying the concepts learned to case studies and lab projects. **Learning can also bring about discomfort, and I will be challenging you in this course.** I will challenge you because **I know we all have the potential to grow and learn.**

Ungrading is central to this course. While ungrading does require work from both you and me, that work has lasting benefits beyond any single lecture or discussion. I want to help you learn about and have fun with building data literacy, but I am also here to help you grow as a learner. **Through the process of ungrading, we will stress less on any grade and focus more on learning.**

Lectures: Lectures will expand on aspects of the assigned readings by going into great depth and applying knowledge to case studies and examples. You are responsible for reading the assigned readings before class to get the most out of the lectures. All lectures will be recorded and posted to the course website within 24 hours.

Labs: Labs will get you involved in the process of science. You are expected to come to lab having reviewed the material for that day and dressed in appropriate attire for safety purposes.

Time Management and Learning Practices

If you find you are struggling with time management or keeping up with the material, please come to office hours or we can schedule a private, one-on-one meeting. You may also talk to your academic advisor or go to the Academic Skills Center for guidance and advice on time management and effective learning practices. **I know that every student can succeed in this course, but sometimes the learning environment and support systems just need to be restructured to make that happen.**

Procedures and Policies

Email Policy: The official method of correspondence with students is through their academic e-mail accounts. It is the student's responsibility to keep his/her/their academic e-mail account active and check it on a regular basis.

To help me better respond to emails, please include BIO120 in the subject line and then your student number either in the text or signature of your email. I also ask for patience when responding to emails. I will try to respond as quickly as possible but give me at least 24 hours to respond to any message. I likely will not respond to emails over the weekend, but I will aim to respond to by 5 PM the following Monday.

Attendance and Participation: Attendance is essential for your learning, as is your participation in active learning during lectures and laboratory activities. I will not take attendance during lecture, but attendance will be taken during labs.

Absences: Absences from laboratory assignments should be communicated to me by email before that class period is over. For an absence to be excused, it must meet university/college-approved and beyond-your-control criteria. Absences beyond university/college guidelines may be excused on a case-by-case basis.

Religious Observance: You are encouraged to observe and express your religious identity. I will make accommodations to allow any student to observe their religious practices without penalty. Please look at the course schedule below and let me know if there are any potential conflicts. Accommodations do not absolve students of responsibility for the coursework, but they can result in extensions.

Extensions: If you require an extension to complete an assignment due to injury, illness, or accessibility, please let me know as soon as possible and preferably at least 24 hours advance of the due date. Extensions beyond accessibility and illness will be granted on a case-by-case basis.

Academic Integrity

University/College statement on academic integrity.

Course Schedule

Week	Unit	Tuesday Lecture	Thursday Lecture	Laboratory
1	Unit 1	Syllabus & Nature of Science Chapter 1	Chemistry and Biological Molecules I Chapter 2.1	Lab 1: Introduction to the scientific process
2		Chemistry and Biological Molecules II Chapter 2.1	Water and Solutions I Chapter 2.2	Lab 2: Scientific writing and resources
3		Water and Solutions II Chapter 2.2	Carbon and Functional Groups Chapter 2.3	Lab 3: Developing experiments and notetaking (paper towel lab)
4		Macromolecules: Carbohydrates and Lipids Chapter 3.1-3.3	Macromolecules: Proteins and Nucleic Acids Chapter 3.4-3.5	TBD
5	Unit 2	Prokaryotic and Eukaryotic Cells Chapter 4.1-4.3	Membranes and Transport I Chapter 5.1-5.2	TBD
6		Membranes and Transport II Chapter 5.3-5.4	Metabolism and Enzymes Chapter 6	TBD
7		Cellular Respiration I Chapter 7.1-7.4	Cellular Respiration II Chapter 7.5-7.7	TBD
8		Photosynthesis I Chapter 8.1-8.2	Photosynthesis II Chapter 8.3	TBD
9	Unit 3	DNA Structure and Replication I Chapter 14.1-14.3	DNA Structure and Replication II Chapter 14.4-14.5	TBD
10		Transcription and Translation I Chapter 15.1-15.3	Transcription and Translation II Mutations Chapter 15.4-15.5 and 14.6	TBD
11		Mitosis Chapter 10	Meiosis Chapter 11	TBD
12	Unit 4	Mendel and Genetic Inheritance Chapter 12	Modern Genetic Inheritance I Chapter 13.1	TBD
13		Modern Genetic Inheritance II Chapter 13.2	Gene Expression I Chapter 16.1-16.3	TBD
14		Gene Expression II Chapter 16.4-16.7	Biotechnology and Genomics Chapter 17	TBD
15	No Class (Final Exams)			