

Course Information

Semester & Year:	Spring 2025
Course Title:	General Biology (Majors) I
Course Prefix & Number:	BIO 181
Section Number:	29306 (lecture), 29309 (lab)
Credit Hours:	4
Start Date:	13 January 2025
End Date:	09 May 2025
Room Number:	Lecture: SL112 ; Download a campus map Lab: NS211
Meeting Days:	MW (lecture); M (lab)
Meeting Times:	3:30 – 4:45pm (lecture); 5:00 – 7:50 pm (lab)

Course Format

The course format for this course is in-person beginning Monday, 13 January 2025. Lecture meets MW 3:30 – 4:45pm with lab immediately following on Mondays 5:00 – 7:50pm. The final lab presentation will be Monday, 28 April 2025. This is the last lab class of the semester. The final lecture exam will be Monday, 5 May 2025.

Weekly goals and activities are posted in Canvas and I will be using section number 29306 for both lecture and lab. Links to optional lecture and supplementary videos in YouTube are also provided.

See the accompanying course schedule for detailed activities and due dates.

Instructor Information

Instructor:	Jennifer McCulley
Email:	jennifer.mcculley@scottsdalecc.edu

Office Location: NS 211 (lab room) or NS107 Tutor Center

Office Hours: By appointment. Please contact me to schedule.

Course Description

The study and principles of structure and function of organisms at the molecular and cellular levels. A detailed exploration of the chemistry of life, the cell, and genetics.

Prerequisites

A grade of C or better in RDG100, or RDG100LL, or higher, or eligibility for CRE101. One year of high school or one semester of college-level biology and chemistry is strongly recommended.

Course Competencies

These are the topics we will cover this semester. Please see the class schedule and Canvas for a breakdown by week.

1. Describe and apply the scientific method to investigate biological phenomena. (I, XI)
2. Describe the characteristics of life. (I)
3. Describe the principles of evolution by natural selection and their relationship to the distinguishing properties of living things. (I)
4. Compare and contrast the most stable subatomic particles and describe how they affect the chemical characteristics of matter. (II)
5. Describe the relationship between atoms and molecules and the importance of chemical bonds to atomic stability, molecular structure and chemical characteristics. (II)
6. Describe the relationships between the structure and functions of the four major kinds of organic macromolecules found in living things. (II)
7. Identify the components of eukaryotic cells and describe their structure and functions. (III)
8. Compare and contrast prokaryotic and eukaryotic cells. (III)
9. Describe the structure and functions of biological membranes. (IV)
10. Describe the importance of membrane structure to cellular permeability and transport processes. (IV)
11. Describe the laws of thermodynamics and their relationship to the energy dynamics of living things. (V)

12. Explain the importance of enzymes to metabolic processes and their mode of action. (V)
13. Explain the importance of adenosine triphosphate (ATP) to living things. (V)
14. Explain the importance of cellular respiration and describe the steps in its metabolic pathway. (VI)
15. Explain the importance of photosynthesis and describe the steps in its metabolic pathway. (VI)
16. Compare and contrast the biological processes of binary fission, mitosis and meiosis. (IX)
17. Describe the process of DNA replication and its relationship to cell division. (VII, IX)
18. Describe the relationship between DNA sequence and the synthesis and conformation of proteins. (II, VII, VIII, IX)
19. Compare and contrast the inheritance patterns of Mendelian and non-Mendelian traits and use standard statistical methods to predict the outcome of monohybrid and dihybrid crosses. (X)
20. Describe gene expression and regulation and the genetic basis of development. (X)
21. Describe common biotechnological techniques and analyze the results of their application. (X)
22. Demonstrate laboratory procedures and safe practices. (XI)
23. Apply principles of scientific method while conducting laboratory activities and experiments. (XI)
24. Perform laboratory activities using relevant equipment, chemical reagents, and supplies to observe biological specimens, measure variables, and design and accurately conduct experiments. (XI)
25. Use light microscopic techniques, in the laboratory or a simulation, to visualize, locate and observe biological specimens at various magnifications and interpret images based on characteristics such as specimen preparation, staining patterns, spatial relationships and plane of section. (XI)
26. Demonstrate, in the laboratory or a simulation, the ability to use pipettes, micropipettes, and other volumetric devices, chemical glassware, balances, pH meters or test papers, spectrophotometers, and separation techniques such as chromatography, differential centrifugation and/or gel electrophoresis to perform activities relevant to other course competencies. (XI)
27. Demonstrate the ability to construct a graph that accurately portrays quantitative data. (XI)
28. Calculate appropriate proportions of solvent and solute(s) to make molar and/or percent solutions of varying concentrations. (XI)

29. Analyze and report data collected during experiments and/or other laboratory activities. (XI)

Texts and Course Materials

- **Text** (required): Biology 2e from OpenStax, Print ISBN 1947172514, Digital ISBN 1947172522, www.openstax.org/details/books/biology-2e.
 - **Your book is available in web view and PDF for free.** You can also choose to purchase on iBooks or get a print version via the campus bookstore or from OpenStax on Amazon.com.
 - You can use whichever format(s) you want. Web view is recommended -- the responsive design works seamlessly on any device. If you buy on Amazon, make sure you use the link on your book page on openstax.org so you get the official OpenStax print version. (Simple printouts sold by third parties on Amazon are not verifiable and not as high-quality.)
- **Calculator** (required): Must be a scientific calculator, able to calculate logarithms and exponentials. (TI-80 series allowed but not required.)
- **Spreadsheet software** (required): Excel strongly recommended (available free to MCCC students), but any standard spreadsheet package will work. Ask me if you're not sure.

Course Technologies

View the [Accessibility Statements & Privacy Policies](#) of technologies used in this course.

Maricopa Systems

This course uses key Maricopa systems for course management and communication.

- Canvas Learning Management System
- Student Maricopa Gmail Account
- Maricopa Open Educational Resource Learning System (MOER)

Streaming Media/Audio/Video Tools

This course uses webcasting, lecture capture systems, YouTube, and/or other streaming media services.

- YouTube

Student Assignment Tools

This course requires students to participate in or submit assignments using desktop or cloud-based applications.

- Google Products
- Microsoft Office 365
- Photo capturing device (like your smartphone)

Exam Proctoring Tool

While our course schedule is designed around using a lecture period to take an exam, history has taught us to expect the unexpected. In the event of the unexpected, exams will be rescheduled online and utilize Respondus LockDown Browser.

Respondus LockDown Browser

Respondus LockDown Browser secures online exams by locking down the testing environment within Canvas. LockDown Browser prevents access to other applications, and many common functions on a computer while an assessment is active. Some of the exams in this course require the use of this software. A LockDown Browser download link will be provided within the Canvas course. For further information, see the [Student Resources](#) page provided. For your reference, read the [System Requirements for LockDown Browser](#) and [LockDown Browser Terms of Use](#).

Please note that Respondus LockDown Browser with Monitor requires a room scan prior to all testing sessions.

Plagiarism Checker Tool (Turnitin)

Turnitin is a plagiarism check tool that matches text to a vast database of sources including the internet, published works, commercial databases and student work submitted to Turnitin in institutions internationally. Students must submit designated papers to Turnitin when instructed. Information and instructions for Turnitin are provided in the course. For your reference, read the [Turnitin Terms of Service](#).

Course Policies

Students are also responsible for the college policies included on the [Student Regulations](#) page of the Maricopa Community College District website. This page includes information on withdrawals, incompletes, attendance, student conduct, excused absences, accommodations and more.

The following are policies specific to this course:

- **Course completion policy:** Students are required to complete all learning modules, laboratory exercises, quizzes, lecture exams, and the final exam for full credit. *Any student who misses more than three labs or fails to submit more than 3 quizzes or 1 lecture exam will be withdrawn for lack of participation at the instructor's discretion. The final exam is required and missing the exam without an official excuse will result in an F for the course (see Final Exam policy below for full details).*

Generative Artificial Intelligence (AI) Policy

Opening Statement Regarding Generative Artificial Intelligence (AI)

The World Economic Forum defines generative AI as “a category of artificial intelligence (AI) algorithms that generate new outputs based on the data they have been trained on. Unlike traditional AI systems that are designed to recognize patterns and make predictions, generative AI creates new content in the form of images, text, audio, and more.”

Some examples of generative AI tools include but are not limited to: ChatGPT, Google Bard, Microsoft Copilot, Stable Diffusion, GrammarlyGo, and Adobe Firefly.

Some Generative Artificial Intelligence (AI) Allowed in Specific Circumstances

There are situations and contexts within this course where you may be permitted to use generative AI tools. In these cases, specific guidelines will be provided in the assignment details. If you are unsure if the tool or website you are using is a generative AI tool or if it is permitted on a specific assignment, please contact the instructor for further clarification before submitting your work.

Grading Standards & Practices

Grade Scale

Letter Grade	Points Range
A	90 – 100%
B	78 – 89%
C	66 – 77%
D	54 – 65%
F	0 – 53%

Assignments

Assignment Name	Points	Percent of Grade
12 Quizzes, 2 dropped	100	11%
11 20-point Laboratories, 1 dropped	200	22%
Mendelian Genetics Lab	40	5%
Laboratory Research Skills (2-part group assignment)	60	7%
Molecular Genetics Proposal (20 pts)		
Molecular Genetics Lab Report (40 points)		
Research Skills (3-part assignment)	100	11%
Journal Special Issue (10 pts)		
Research Presentation Outline (20 pts)		
Research Presentation (70 pts)		
3 Lecture Exams, 1 dropped	200	22%
Final Exam	200	22%
TOTAL:	900	100%

1. **Learning Modules:** These and the laboratory exercises form the heart of the course. Each module corresponds to a standard lecture, or portion thereof, in a regular 16-week term.

2. **Lecture Quizzes**

Number of quizzes : 12 (one each non-exam week).

Value : 10 points each, lowest 2 scores dropped.

Dates : Each week with no exam. See course schedule.

Format : Multiple choice, matching, fill-in-the-blank.

Material covered : Current week only (see schedule).

Quizzes are due before 11:59 PM Arizona time on the day indicated on the schedule. **No late quizzes will be accepted.**

You will be given 3 attempts to complete each quiz. Your highest score will be recorded and added to your points. Use the weekly Study Guides provided to help you frame the material.

3. **Lecture Examinations**

<i>Number of examinations</i>	:	3
<i>Value</i>	:	100 points each, lowest score dropped
<i>Dates</i>	:	See course schedule.
<i>Format</i>	:	Multiple choice, matching and short answer essay.
<i>Material covered</i>	:	Current unit only (see schedule).

Exams focus on concepts developed in the lecture modules and laboratory exercises. Only a small portion of each exam will test your ability to memorize. Most questions are designed to test your ability to reason, synthesize ideas and solve problems. Use the weekly Study Guides provided for sample questions.

Exams are in-person and there are absolutely no make-up examinations. If a student misses two exams, that student will be assigned a failing grade and/or withdrawn from the course at the instructor's discretion.

Students must abide by the examination rules as set out on the exam cover sheet and instructions from the professor prior to the exam. If a student fails to abide by the rules of the exam, that student will earn zero points for that examination. The student will also face potential dismissal from class and the college with a permanent record of the infraction of the student's transcript (see "Student Misconduct" section below).

4. **Final Examination**

<i>Value</i>	:	200 points.
<i>Date of exam</i>	:	Monday, 5 May 2025
<i>Time of exam</i>	:	Regular lecture time.
<i>Format</i>	:	Multiple choice, matching, and essay.
<i>Material covered</i>	:	All lecture and lab material throughout the course.

The final exam is comprehensive and required. Questions can be derived from any lecture or lab material.

Students are required to follow the rules of the examination as described in the exam instructions. Students who do not follow the rules automatically fail the course (grade of F) and face potential dismissal from the college with a permanent record of the infraction on their transcript. (See the "Student Misconduct" section.)

If a student misses the final exam with a college-sanctioned excused absence approved by the professor, that student will receive a grade of "incomplete." If a student misses the final with an unexcused absence, that student will automatically fail the course. Note: early vacation, including pre-purchased airline tickets, other exams or work-related conflicts do not constitute valid excuses.

5. **Laboratory**

There are 13 laboratories in this class and 4 assignments.

- Eleven laboratories include a 20-point write-up, the lowest of which is dropped.
- The Mendelian Genetics laboratory has a 40-point write-up and is not eligible to drop.
- You will also be simulating some of the normal duties of scientists and medical professionals which will be assessed as two multi-part assignments:
 - Laboratory Skills (group project; 60 points total)
 1. Prepare a research proposal for a lab experiment you will conduct (20 points).
 2. Prepare a report to write up the results of your experiment (40 points).
 - Research Skills (individual project; 100 points total)
 1. Assemble a collection of articles and citations on a topic of your choosing relevant to class. This simulates a special issue of a professional journal (10 points)
 2. Prepare a summary outline of a single research paper (20 points) and
 3. Present your outline to the class at the end of the semester (70 points).

Therefore, the lab is worth a total of 400 points and is ~40% of your final grade.

Laboratory completion is mandatory. Students must complete all laboratory exercises to pass the course. Lab due dates are given on the lab schedule.

- 20-point labs submitted late will receive a 10% reduction for every week late up to 3 weeks late (i.e., the grade on a lab submitted 3 weeks late will be reduced by 6 points. So, if you score 16/20 on a lab submitted 3 weeks late, your final grade on that lab will be 10/20 after the late penalty).
- The last day to submit any late labs still eligible for grading is 11:59 p.m. Arizona time on final exam day.
- Once a lab or assignment is submitted for grading, it cannot be re-submitted for re-grading.

The laboratory is designed to introduce you to important biological research techniques and is absolutely central to your training. Since organization, neatness and attention to detail are critical to successful scientific study, you will be graded on these qualities.

Response Time

Students can expect a response time of 24 hours during the week and 48 hours on weekends for the instructor to respond to messages sent via the Canvas Learning

Management System or email. Students can expect assignments to be graded within 1 week of the assignment's due date.

Attendance Policy

Roll is taken at the beginning of each class and lab. Attendance is defined as arrival to class prior to the scheduled starting time and continuous participation in the class until at least the scheduled finishing time every day the class is scheduled to meet. **Students who arrive late, leave early, sleep, check email, surf the internet or otherwise disengage during any class activity or lecture will be marked as absent for that day.**

Any student who misses more than 3 labs, 6 lectures or 3 consecutive lectures, or more than 1 lecture exam will be withdrawn for excessive absences at the instructor's discretion. Please contact me ASAP if you are struggling to meet the demands of the course or having difficulties with school-life balance so we can discuss your options. Life happens and together we can find a path forward.

Instructional Contact Hours (Seat Time)

This is a four (4) credit-hour course composed of a 3-hour lecture and 3-hour lab. Plan to spend six hours seat time (direct instruction; 3-hours lecture + 3-hours lab) and twelve hours on homework weekly.

Online Tutoring

SCC's tutors are available online to help with your courses. You may work with an SCC tutor remotely using Google Meet, your phone, or email. Visit the [Tutoring & Learning Centers](#) page for detailed information on the five learning center's hours and procedures.

As much as possible, it is highly recommended that you utilize SCC tutors since they are more familiar with SCC coursework, instructor expectations, and assignments; however, if you need to work with a tutor outside regular hours, online and hybrid students now have access to a 24/7 online tutoring service called Brainfuse. Brainfuse provides online tutoring in a variety of academic subjects. Each student may utilize up to 6 hours of online tutoring through Brainfuse per semester, and has the option of requesting additional time if needed.

To access Brainfuse and begin working with a tutor:

1. Visit the [SCC Online Tutoring Services Through Brainfuse](https://www.scottsdalecc.edu/students/tutoring/online-tutoring) page (https://www.scottsdalecc.edu/students/tutoring/online-tutoring)
2. Click the **Visit a tutor online** button
3. Enter your MEID and password
4. Choose your topic and subject
5. Click the **Connect** button

Please use your time effectively and be prepared with your questions before you connect to a tutor. Tutors and students communicate in real-time so whatever you type, draw, or share on the screen, the tutor sees, and vice versa. You may also want to have screenshots ready if applicable. All Brainfuse sessions are recorded for review later.

Learning Tools and Your Privacy and Security

SCC utilizes a variety of software applications and web-based tools operated by third party vendors to support student learning. To allow student access to the application, site or tool, certain identifiable information may be required to establish a user name or password, and submit work and/or download information from these tools. Inherent with all internet-based tools, there is a risk that individuals assume when electing to use these tools, as they may place information at risk of disclosure.

To use learning tools responsibly, please observe all laws and the Maricopa Community College District [Student Conduct Code](#), such as copyright infringement, plagiarism, harassment or interference with the underlying technical code of the software. As a student using a learning tool, you have certain rights. Any original work that you produce belongs to you as a matter of copyright law. You also have a right to the privacy of your educational records. Your contributions to learning tools constitute an educational record. By using the tool, and not taking other options available to you in this course equivalent to this assignment that would not be posted publicly on the internet, you consent to the collaborative use of this material as well as to the disclosure of it in this course and potentially for the use of future courses.

Students are responsible for the information contained in this syllabus, the Syllabus page in your Canvas course and the **College Policies & Student Services** page found in the First Steps module of your Canvas course. Students will be notified by the instructor of any changes in course requirements or policies.

TENTATIVE COURSE SCHEDULE AND READING ASSIGNMENTS

Date	Lecture	Title	Reading	Laboratory	Assignments Due*
1/13	1.1	Introduction to Science	Ch 1, Baloney Detection Handout	Nature of Science and	1/19 (Su) Quiz 1
	1.2	Chemistry Fundamentals	Ch 2	Biomolecules	
1/15	1.3	Chemistry of Life: Biomolecules	Ch 2 & 3, Probability & Sci. Notation Handouts	Assigned	
1/20	-	<i>Martin Luther King, Jr. Day</i>	- <i>No Classes!</i>	<i>No Lab</i>	1/20 (M) Nature of Science Lab
1/22	1.4	Foundations of Biology	Ch 3, § 6.1, NASA Mars website		1/26 (Su) Quiz 2
1/27	1.5	Cells & Chromosomes	§§ 4.1-4.5, § 5.1, § 10.1, Graphing & Basic Statistics Handouts	Mitosis & Meiosis	1/27 (M) Biomolecules lab
1/29	1.6	Cell Reproduction	§§ 10.2-10.5 & 11.1		2/2 (Su) Quiz 3
2/3	1.7	Scientific Communication		Professional Research (Library)	2/3 (M) Mitosis & Meiosis Lab
2/5	-	Exam 1	LM 1.1-1.7		No quizzes
2/10	2.1	Mendel's Experiments and the Basics of Genetics	Ch 12	Patterns of Inheritance (40 pts)	2/10 (M) Prof. Research & Journal Special Issue
2/12	2.2	Exceptions to Mendel and Multiple Mendelian Traits			2/16 (Su) Quiz 4
2/17	-	<i>President's Day</i>	- <i>No Classes!</i>	<i>No Lab</i>	2/19 (W) Patterns of Inheritance lab
2/19	2.3	Modern Genetics	Ch 13		2/23 (Su) Quiz 5
2/24	2.4	Evidence for evolution	Ch 18	Natural Selection	3/2 (Su) Quiz 6
2/26	2.5	Principles of natural selection	Ch 19		
	2.6	Hardy-Weinberg principle	Ch 20 (phylogenetics)		
3/3	-	TBA		Genetic Drift	3/3 (M) Natural Selection Lab
3/5	-	Exam 2	LM 2.1-2.7		No quiz
-	-	Spring Break - No Classes	No Classes	No Lab	3/8 - 3/16
3/17	3.1	DNA structure & replication	Ch 14	Gene Regulation I	3/17 (M) Genetic Drift lab, Research Skills Part 2
3/19	3.2	Transcription	§§ 15.1-15.3		3/23 (Su) Quiz 7
3/24	3.3	Translation	§§ 15.4-15.5	Applied Genetics (Ch 17)	3/24 (M) Gene Reg. I Lab + Proposal
3/26	3.5	Gene structure & function	Ch 16		3/30 (Su) Quiz 8
3/31	3.6	Gene regulation	Ch 16	Gene Regulation II	3/31 (M) Applied Genetics lab
4/2	-	Exam 3	LM 3.1 - 3.6		No quiz

4/7	4.1	Membrane transport	Ch 5	PCR & ELISA	4/7 (M) Gene Reg II report
4/9	4.2	Thermodynamics	Ch 6		4/13 (Su) Quiz 9
4/14	4.3	Enzymes & metabolism		Enzymes	4/14 (M) PCR lab
4/16	4.4	Glycolysis	Ch 7		4/20 (Su) Quiz 10
4/21	4.5	Krebs cycle		Respiration	4/21 (M) Enzymes lab
4/23	4.6	Electron transport and OxPhos			4/27 (Su) Quiz 11
4/28	4.7	Light-dependent reactions	Ch 8	Presentations	4/28 (M) Respiration lab
4/30	4.8	Light-independent reactions			
5/5	-	Final Exam	Cumulative	No Lab	No quizzes

* Assignments must be completed by 11:59 PM on the date listed.

Expectations

Create your own study plan.

- I provide you with what is due and when, but you need to study in a way that works for you and plan your days to keep current.

Use your resources!

- **Canvas.** The course is laid out by Exam Unit and by week in Canvas.
- **Study Guides.** Use them to test yourself weekly.
- **Your Textbook.** Yes, web searches are easy, but their results are often wrong.
- **Free Tutors.** Meet with the course tutors. They've taken this class before and excelled at it. You will benefit from their experience!
- **Me.** Meet with me or send me a message. I'm teaching the course, so somebody thinks I know something about biology.

Don't wait to contact me.

- If you start falling behind / feel lost / feel unsure /etc. – contact me ASAP! **I can help you get back on track before it's too late.**
- If something happens- you get sick, you have to move, you are injured, or any other known or unforeseen happenstance- contact me ASAP so we can develop a plan. **It's better to plan ahead than have to triage a problem that could have been avoided.**