

Course Title: Principles of Biology: Introductory Laboratory

Course Number: BIOL 2103L

Course Credits: 1

Term: Fall 2023

Course Meeting Times: Variable (see registered section details)

Course Location: CAST 42

Course Coordinator: Moses Michelsohn

Course Coordinator Email: mmichelsohn@unm.edu

Course Coordinator Office: CAST 66

Course Coordinator Phone: (505) 277-3645

Course Coordinator Student Drop-in Hours: By appointment (scheduling link on Canvas)

Course Description: The Biology Introductory Series (BIOL 2101, 2102, and 2103L) introduces undergraduate students to the breadth of topics investigated in the field of biology. BIOL 2103L trains students in basic laboratory practices commonly used in a variety of fields in biology.

Course Goals: Students enrolled in BIOL 2103L will:

- 1) develop an understanding of the scientific method and its application in biology – including the formulation of biological hypothesis statements, null hypotheses, and their corresponding statistical hypotheses.
- 2) be trained to collect data using contemporary laboratory equipment commonly used in research settings in biology, critically evaluate sources of experimental error, and analyze data using common statistical methods.
- 3) learn to critically evaluate sources of scientific knowledge, properly cite source materials, and present new scientific understanding in written and oral formats.

Student Learning Outcomes: Students who complete BIOL 2103L will be able to:

- 1) demonstrate a knowledge of the scientific method and its application and effectively communicate scientific results in written and oral formats.
- 2) demonstrate an ability to formulate biological hypothesis statements and corresponding statistical hypotheses about student laboratory exercises.
- 3) demonstrate an ability to collect, organize, and graphically represent experimental data (including measurements of sample error) using spreadsheets and R.
- 4) demonstrate an ability to calculate and summarize student-collected data using basic summary statistics including the mean, the median, variance, and standard deviation.
- 5) demonstrate an ability to apply and interpret frequentist hypothesis testing using Student's one-tailed and two-tailed t-tests to draw conclusions about student-collected data.
- 6) demonstrate an ability to apply and interpret the coefficient of determination in regression analysis of student-collected data.
- 7) demonstrate the proper use of sources, bibliographic references, and citations in student writing.
- 8) demonstrate proper use and care of common laboratory equipment in biology including compound microscopes, dissecting microscopes, calipers, micropipettes, and spectrometers.
- 9) demonstrate proper sterile techniques in the laboratory environment.
- 10) characterize the cellular morphology of Bacteria, Archaea, and Eukarya and explain the non-tree-like relationships between the domains of life.

Required Materials: Students enrolled in BIOL 2103L are required to obtain one of the following texts in either digital, print, or audio format (students will choose their text during the first week of the course):

- ❖ Isaacson, W. (2022) *The code breaker: Jennifer Doudna, gene editing, and the future of the human race*. Simon & Schuster.
- ❖ Kimmerer, R. W. (2015) *Braiding sweetgrass*. Milkweed Editions.
- ❖ Kolbert, E. (2015) *The sixth extinction: An unnatural history*. Picador.
- ❖ Quammen, D. (2019) *The tangled tree: A radical new history of life*. Simon & Schuster.
- ❖ Raff, J. (2022) *Origin: A genetic history of the Americas*. Twelve.
- ❖ Yong, E. (2018) *I contain multitudes: The microbes within us and a grander view of life*. Ecco.

Course Requirements: Student performance in BIOL 2103L is based on the following:

- ❖ **Lab Products (LP):** Students are required to complete a lab product based on the data collected during each week's laboratory activities. Lab Products usually consist of a figure and figure caption. Lab Reports must be submitted online by 11:59pm on the Sunday following each week of lab. The lowest two scores (of 13 total) will be dropped for each student.
- ❖ **Reading Assignments (RA):** Students are required to choose and obtain one of the required texts for BIOL 2103L during the first week of the course and read it outside of class-time throughout the semester. In the first week students will complete an online workshop highlighting effective study strategies and student resources. In subsequent weeks students will read assigned portions of their chosen text and complete online assignments based on the assigned reading for the next eight reading assignments. Students will then complete an online workshop training students to utilize UNM libraries resources. The penultimate Reading Assignment requires students to choose a primary literature article related to their chosen text and write a brief summary of the chosen article (submitted online). The final Reading Assignment requires students to critically evaluate their peers' written summaries.
- ❖ **Biology Course Surveys (EC):** Students complete two course surveys during the semester – a pre-survey at the start of the semester and a post-survey at the end of the semester. These surveys collect data on student progression in the biology program, comprehension of topics in this and other required courses in the biology major, student reflections, and student comments. Student performance on these surveys is based on completion not on evaluated competency. Anonymized results of these surveys are used by the Department of Biology to evaluate and revise the program. Students can earn a 1% bonus to their course grade for completion of each survey.

Student Time Management: Students are expected to spend approximately 2 hours working on course materials outside of their scheduled lab section each week. Students are encouraged to review the Graduate Teaching Assistant Drop-in Hours (posted online) while planning when to work on their assignments.

Attendance and Late Work: Students are expected to attend all thirteen labs each semester. Students are required to arrive on-time to their lab section every week, and are expected to remain in class for the duration of their scheduled section. Students that arrive late will not be allowed into their lab session once it has started. Students that choose to leave early may lose credit for attendance at their lab session.

Students that miss a lab session will receive a zero for the Lab Products assignment associated with that lab session. Students cannot attend other sessions during the week to make up for a missed lab session. All late work in BIOL 2103L will receive a zero. All

assignments are completed or submitted online and will not allow student access following their due dates.

The lowest two scores on Lab Products are dropped for all students. This grading scheme gives students two chances to miss lab during the semester without serious implications for their course grade (zeros on the Lab Products dropped as lowest grades). Students who miss lab without excuse do not need to contact their Graduate Teaching Assistant or the Course Instructor following a missed lab.

Students who miss a lab for an excused reason (Medical, Bereavement, Armed Services, UNM Athletics, Traditional Obligation, etc.) must submit an absence report to the Course Instructor in a timely fashion (refer to online instructions) to arrange an alternative.

Course Grades: Students are responsible for actively tracking their grades online. Students with lab grade concerns should address them with their Graduate Teaching Assistant or Course Instructor as soon as possible upon receiving graded work. All grades are considered permanent 2 weeks after a grade is assigned. Students are responsible for adhering to all UNM grade policies. This course is not offered for Credit/No Credit.

Course Grading Scheme

Assignment Name	Iterations	Drops	Grade Portion
Laboratory Products	13	Two lowest scores	70%
Reading Assignments	12	None	30%
Biology Course Surveys	2	N/A	Up to 2% Extra Credit

Semester Grading Scheme

Grade Range	0 - 59.49	59.5 - 67.49	67.5 - 69.49	69.5 - 77.49	77.5 - 79.49	79.5 - 87.49	87.5 - 89.49	89.5 - 97.49	97.5+
Letter Grade	F	D	D+	C	C+	B	B+	A	A+

UNM Accommodations Statement: UNM is committed to providing equitable access to learning opportunities for students with documented disabilities. As your instructor, it is my objective to facilitate an inclusive classroom setting, in which students have full access and opportunity to participate. To engage in a confidential conversation about the process for requesting reasonable accommodations for this class and/or program, please contact Accessibility Resource Center at arcsrvs@unm.edu or by phone at 505-277-3506.

UNM Citizenship and/or Immigration Status Statement: All students are welcome in this class regardless of citizenship, residency, or immigration status. Your professor will respect your privacy if you choose to disclose your status. As for all students in the class, family emergency-related absences are normally excused with reasonable notice to the professor, as noted in the attendance guidelines above. UNM as an institution has made a core commitment to the success of all our students, including members of our undocumented community. The Administration's welcome is found on our website: <http://undocumented.unm.edu/>.

UNM Connecting to Campus and Finding Support Statement: UNM has many resources and centers to help you thrive, including opportunities to get involved, mental health resources, academic support such as tutoring, resource centers for people like you, free food at Lobo Food Pantry, and jobs on campus. Your advisor, staff at the resource centers and Dean of Students, and I can help you find the right opportunities for you.

UNM Credit-hour Statement: This is a one credit-hour course. Class meets for one 170-minute sessions of direct instruction for fifteen weeks during the Fall 2023 semester. Please plan for a minimum of two hours of out-of-class work (or homework, study, assignment completion, and class preparation) each week.

UNM Land Acknowledgement: Founded in 1889, the University of New Mexico sits on the traditional homelands of the Pueblo of Sandia. The original peoples of New Mexico Pueblo, Navajo, and Apache since time immemorial, have deep connections to the land and have made significant contributions to the broader community statewide. We honor the land itself and those who remain stewards of this land throughout the generations and also acknowledge our committed relationship to Indigenous peoples. We gratefully recognize our history.

UNM Respectful and Responsible Learning Statement: We all have shared responsibility for ensuring that learning occurs safely, honestly, and equitably. Submitting material as your own work that has been generated on a website, in a publication, by an artificial intelligence algorithm, by another person, or by breaking the rules of an assignment constitutes academic dishonesty. It is a student code of conduct violation that can lead to a disciplinary procedure. Please ask me for help in finding the resources you need to be successful in this course. I can help you use study resources responsibly and effectively. Off-campus paper writing services, problem-checkers and services, websites, and AIs can produce incorrect or misleading results. Learning the course material depends on completing and submitting your own work. UNM preserves and protects the integrity of the academic community through multiple policies including policies on student grievances (Faculty Handbook D175 and D176), academic dishonesty (FH D100), and respectful campus (FH CO9). These are in the Student Pathfinder (<https://pathfinder.unm.edu>) and the Faculty Handbook (<https://handbook.unm.edu>).

UNM Title IX Statement: Our classroom and our university should always be spaces of mutual respect, kindness, and support, without fear of discrimination, harassment, or violence. Should you ever need assistance or have concerns about incidents that violate this principle, please access the resources available to you on campus. Please note that, because UNM faculty, TAs, and GAs are considered "responsible employees" any disclosure of gender discrimination (including sexual harassment, sexual misconduct, and sexual violence) made to a faculty member, TA, or GA must be reported by that faculty member, TA, or GA to the university's Title IX coordinator. For more information on the campus policy regarding sexual misconduct and reporting, please see: <https://policy.unm.edu/university-policies/2000/2740.html>.

Course Schedule Fall 2023

Week	Dates	Topic and assignments
01	Aug 21 – Aug 25	Lab Topic: The Process of Science Due by 11:59pm on Aug 27: LP-01, RA-01, EC-01
02	Aug 28 – Sep 01	Lab Topic: Quantifying a Freshwater Community Due by 11:59pm on Sep 10: LP-02, RA-02
03	Sep 04 – Sep 08	No Lab Sections Labor Day
04	Sep 11 – Sep 15	Lab Topic: Tree Thinking Due by 11:59pm on Sep 17: LP-03, RA-03
05	Sep 18 – Sep 22	Lab Topic: The Tangled Tree Due by 11:59pm on Sep 24: LP-04, RA-04
06	Sep 25 – Sep 29	Lab Topic: Domains of Life Due by 11:59pm on Oct 01: LP-05, RA-05
07	Oct 02 – Oct 06	Lab Topic: Microbial Life Due by 11:59pm on Oct 15: LP-06, RA-06
08	Oct 09 – Oct 13	No Lab Sections UNM Fall Break
09	Oct 16 – Oct 20	Lab Topic: Gene Expression and Regulation Due by 11:59pm on Oct 22: LP-07, RA-07
10	Oct 23 – Oct 27	Lab Topic: Homeostasis and Cellular Respiration Due by 11:59pm on Oct 29: LP-08, RA-08
11	Oct 30 – Nov 03	Lab Topic: Quantifying Biodiversity Due by 11:59pm on Nov 05: LP-09, RA-09
12	Nov 06 – Nov 10	Lab Topic: Population Dynamics Due by 11:59pm on Nov 12: LP-10, RA-10
13	Nov 13 – Nov 17	Lab Topic: Morphology and Morphometry Due by 11:59pm on Nov 26: LP-11, RA-11
14	Nov 20 – Nov 24	No Lab Sections Thanksgiving
15	Nov 27 – Dec 01	Lab Topic: The Carbon Cycle Due by 11:59pm on Dec 03: LP-12, RA-12
16	Dec 04 – Dec 08	Lab Topic: Conservation Due by 11:59pm on Dec 10: LP-13, EC-02
17	Dec 11 – Dec 15	No Lab Sections Final Exams