

SYLLABUS

COURSE TITLE: BIOLOGICAL RESEARCH LABORATORY (2 CREDITS)

COURSE CATALOG CODE AND SECTION NUMBER: 01:119:117

SEMESTER: SPRING 2026

Course Instructor and Contact Information

- **Instructor:** Dr. Monica Torres (she/her)
- Email: biolab@dls.rutgers.edu. Please expect a turnaround time of 24–48 hours.
- Canvas course site: <https://canvas.rutgers.edu/>

Course Meeting Days, Times, Location, and Modality

The Biological Research Laboratory (BRL) course is offered **in person**. Lab sections (4 hours) and lecture (1 hour 20 min) will meet weekly.

Lecture Sections (1 hour 20 min, weekly)

Attend the lecture section associated with your lab section.

- **Busch:** Fridays 10:20–11:40 AM, ARC 103
- **Cook/Douglass:** Wednesdays 2:00–3:20 PM, Hick 138

Lab Sections (4 hours, weekly)

- **Busch:** Busch Laboratory Center
- **Cook/Douglass:** Biological Sciences Building

Use [Rutgers Maps](#) to locate buildings.

Student Support Hours (Office Hours)

These meetings are drop-in; you may attend any session if you need assistance. These are not recitations — come prepared to explain your questions or concerns. Do not share course Zoom links or passwords with anyone outside of the course.

- **Dr. Torres (Zoom):** Wednesdays 8:00–9:30 AM (EST). See the Zoom link in the Canvas Course Information Module.
- **Teaching Assistant Support Hours (Zoom):** Mondays, Tuesdays, Wednesdays, and Thursdays. See link in the Canvas Course Information Module.

Course Description

The BRL course aims to encourage students to learn, practice the process of science, and gain research skills. The course is organized into three main parts: (1) basic skills needed to work in a lab setting using local aquatic ecosystems as biological systems; (2) biodiversity using DNA barcoding; and (3) a capstone research project completed in teams.

The laboratory is structured so that activities are connected throughout the semester. Students will gain an appreciation of how one experiment builds on another and how procedures at one step affect results and interpretations at another. Throughout the semester, students will learn hands-on techniques, collect and analyze data, and develop approaches to understand biological systems fully.

The **Capstone Research Project** is a multi-week student-designed project completed in teams. It offers students the opportunity to formulate and test a hypothesis using the scientific method, while developing written and oral presentation skills.

Throughout the semester, students will practice pipetting, serial dilutions, data analysis, and lab equipment and safety protocols. **Transferable skills** — communication, teamwork, leadership, organizational, and technical skills — acquired in this course can be used to update your résumé for future academic or career opportunities (see [Rutgers Career Services](#)).

Course Prerequisites

Students enrolled in 01:119:117 BRL must have previously completed 01:119:115 General Biology I (or 01:119:101) with a **C or better**. It is highly recommended that students have completed or be co-registered in 01:119:116 General Biology II this semester.

Required Texts and Course Materials

Textbook

- *Biology 2e* (free online): <https://openstax.org/details/books/biology-2e> — a hard copy is not required.

Lab Manual

- Lab Manual Spring 2026 copies will be provided in person at Lab 1. Other handouts will be posted on Canvas modules.

Recommended Resources

- Pechenik, J. A. 2016. *Guide to Writing about Biology* (9th edition or earlier editions). Older versions may be available as free PDF files; students are responsible for locating a free copy or purchasing their own.

Technical and Technology Requirements

Technology

- A desktop or laptop computer (no Chromebook, iPad, tablet, or similar devices) with internet access is required to access Canvas daily. High-speed internet is strongly recommended for videos, demonstrations, and timed assessments. A microphone and camera are recommended for Zoom.
- If you do not have the appropriate technology for financial reasons, please email the instructor to request assistance.

Software

- BRL 117 uses **Microsoft Office** (PowerPoint, Word, Excel) for presentations and assignments. The university provides [free access](#) and [download instructions](#).

Course Learning Outcomes

By fully participating in this course, students will:

- I. Acquire appropriate factual and conceptual knowledge on which they can further their education and manage a career.
- II. Understand and develop an appreciation for research as the basis of scientific study.
- III. Understand and appreciate the process of science, and acquire the ability to use scientific reasoning as embodied by the scientific method.
- IV. Understand biology as a framework of related concepts and appreciate the connections within biology and between biology and other scientific disciplines.
- V. Learn to work within a team to develop and test a scientific hypothesis using the scientific method.

Attendance

Why Attendance Matters

- Attend your lab classes (lab and lecture) regularly and complete all course activities for the best chance of success.
- Attending your regular lab section allows you to practice new skills. Some aspects of regular sections — particularly teamwork — cannot be replicated in a makeup lab.
- *Events and circumstances outside the classroom can impact our ability to be present and engaged. At Rutgers, we are focused on the whole student. If, at any*

point, you experience anything impacting your performance, please reach out at biolab@dls.rutgers.edu. See the Student Support and Resources section at the end of this syllabus.

Absences

- If you cannot attend a class, please submit a **MU FORM** posted in the Canvas Course Information Module.
- A **makeup laboratory section** is offered on Fridays of the same week as the missed lab, at the Busch Laboratory Center (BLC) Room 160, at 8:30 AM and 12:30 PM.
- **Minimum requirements to pass the course:** Students must attend at least 10 laboratory sections, complete the midterm exam (practical), fully participate and collaborate in team activities to complete a capstone research project, and deliver the final oral capstone presentation.

Teamwork and Collaboration

You are expected to be on time, prepared to work, and actively participate throughout class. Labs are 4-hour periods to allow skills practice and in-class teamwork. Most teamwork can be finalized during class time. **Full participation and collaboration of all team members are mandatory** to complete the course. Use your in-class time efficiently.

Team Roles

Students will work in teams for most laboratory sections. Team members rotate through the following roles and responsibilities each week.

Role	Role Description
Team Leader	Manages the team and ensures members are fulfilling their assigned roles. Ensures that each team member is using and practicing how to use the instruments.
Protocol Manager	Ensures that the experimental protocol is being followed appropriately (e.g., gives an overview of the experiment, recognizes variables, and follows protocol steps in the lab manual).
Data Recorder	Oversees recording data generated by the team and makes sure all team members write down collected data. Takes the lead in data analysis and interpretation of results.
Researcher	Discusses and/or uses predictions to detect problems/mistakes during data collection (e.g., negative absorbance, negative turbidity). Guides team members to use problem-solving skills and critical thinking to discuss and understand collected data.

Late Policies for Graded Activities

All graded activities have specific deadlines. Homework assignments are keyed to specific moments in the course, and everyone receives feedback on schedule.

- **Quizzes** are in-class activities. A pre-lab and post-lab quiz are scheduled each week. No additional time is permitted for pre-lab quizzes if you arrive late.
- **Homework (HW)** activities are individual or team-based. In-class HW is due before the end of the class period. Other HW is due before the start of the next class.
- **Late penalty:** –25 points for submissions up to 24 hours late. Submissions more than 24 hours late receive 0 points.
- For graded activities on Canvas, each activity will have specific instructions. Additional penalties may apply for team activities such as the Capstone project.

Disability Accommodations

If you need accommodations, contact the [Office of Disability Services \(ODS\)](#) as soon as possible at the start of the semester. The ODS will help you request a Letter of Accommodation (LOA). Submit your LOA as early as possible so accessibility needs can be met in a timely manner.

Classroom Community

Students must exhibit professional behavior in lectures, labs, student support hours, and exams. The classroom will be a mutually respectful, inclusive environment — free from discrimination — where everyone is comfortable and at liberty to contribute to and benefit from the entire learning experience.

Schedule of Topics

Use the weekly schedule below to find the topics covered each week during the semester.

First lecture: Wednesday, January 21 and Friday, January 23

First lab: Week of January 26

Week of	Lecture Topic	Lab
Jan 21-23	Course Introduction and Tools of Science	No Labs

Week of	Lecture Topic	Lab
Jan 26-30	Scientific Method	Lab 1. Lab Skills
Feb 2-6	Aquatic Ecology and Introduction to Capstone Project	Lab 2. The Scientific Method
Feb 9-13	Aquatic Ecology and Water Quality Index I	Lab 3. Aquatic Ecology and the Water Quality Index
Feb 16-20	Aquatic Ecology and Water Quality Index II	Lab 4. WQI and Capstone Project
Feb 23-27	DNA Barcoding: PCR	Lab 5. Calculating WQI, and DNA Barcoding
March 2-6	DNA Barcoding: Electrophoresis and gel analysis	Lab 6. DNA Barcoding Project: Polymerase Chain Reaction
March 9-13	Capstone Research Project Review	Lab 7. DNA Barcoding Project: Agarose Gel Electrophoresis
March 16-20	SPRING BREAK	SPRING BREAK
March 23-27	Midterm Review	Lab 8. Capstone Project Experiment set up
March 30-April 3	Midterm Exam / Practical in regular lab section (Lab 9)	
April 6-10	DNA Barcoding: DNA sequence analysis (FinchTV)	Lab 10. Capstone Project data collection
April 13-17	DNA Barcoding: DNA sequence analysis (BLAST analysis)	Lab 11. Finalize DNA Barcoding and Capstone Projects
April 20-24	Career Readiness Seminar Cycle (NJ Dept of Labor, Local Industry Leaders, SEBS – extra credit)	Lab 12. BRL117 Semiannual Student Research Symposium – Project Oral Presentations
May 4	Regular class end	
May 5-6	Reading days	
	No Final Exam	

Grades, Assessment, and Grading Components

The course uses the BRL 117 Gradebook to post official grades. The standard Rutgers grade scale will be used. At the end of the semester, a final letter grade will be assigned; a curve is not anticipated.

Percentage	Grade
90–100%	A
85–89%	B+
80–84%	B
75–79%	C+
70–74%	C
60–69%	D

For a complete description of the course grading components and grade distribution, consult the **Student Course Policy** posted in the Canvas Course Information Module.

Schedule of Graded Activities

Use the schedule below to find graded activities and deadlines for each week.

- Weekly quizzes: pre-lab and post-lab quizzes are completed during class time.
- Homework (HW) assignments are individual or team activities completed in class or outside of class and submitted through Canvas. Read the Canvas instructions before submitting.

Week	Assignment	Deadline
1 – General Lab Skills	(1) Prelab quiz (dress code and lab safety), Canvas Quiz / Gradebook/PreQ1 (2) In-Class Post-lab quiz, Gradebook/PostQ1	(1) Before attending Lab 1
2 – General Lab Skills (cont.) and Introduction to Scientific Method	(1) In-Class Prelab quiz, Gradebook/PreQ2 (2) In-Class Post-lab quiz, Gradebook/PostQ2	
3 – Aquatic Ecology and the Water Quality Index (WQI)	(1) In-Class Prelab quiz, Gradebook/PreQ3 (2) In-Class Post-lab quiz, Gradebook/PostQ3	
4 – WQI and Capstone Research Project Proposal	(1) In-Class Prelab quiz, Gradebook/PreQ4 (2) In-Class Post-lab quiz, Gradebook/PostQ4 (3) Lab 4 Homework assignment (Canvas team assignment): capstone research proposal	(3) Before attending Lab 5
5 – Calculating WQI and DNA Barcoding	(1) No Prelab quiz (2) In-Class Post-lab quiz, Gradebook/PostQ5	

Week	Assignment	Deadline
6 – DNA Barcoding Project: Polymerase Chain Reaction	(1) In-Class Prelab quiz, Gradebook/PreQ5 (2) In-Class Post-lab quiz, Gradebook/PostQ6 (3) Homework assignment (Canvas team): revised capstone research proposal	(3) Before attending Lab 7
7 – DNA Barcoding Project: Agarose Gel Electrophoresis	(1) In-Class Prelab quiz, Gradebook/PreQ6 (2) HW Post Lab 7 quiz – Experimental design and using descriptive and inferential statistics in research, Gradebook/PostQ7 (Individual Homework Post-Lab Quiz) (3) In-class assignment (Canvas Team): Gradebook/Barcode/bar 1 – Gel analysis	(3) Before end of Lab 7 (2) Before attending Lab 8
8 – Capstone Research Project: Experimental Setup	(1) In-Class Prelab quiz, Gradebook/PreQ7 (2) In-Class Post-lab quiz (review quiz), Gradebook/PostQ8	
9 – Midterm Exam / Practical	Midterm Practical Exam: individual assessment during regular lab class. No quizzes or assignments during week 9.	
Lab 10 – Capstone Research Project: Data Collection and DNA Sequence Analysis I (FinchTV)	(1) In-Class Prelab quiz, Gradebook/PreQ8 (2) In-Class Post-lab quiz, Gradebook/Barcode, bar 2 (3) In-class Canvas individual assignment – DNA sequence analysis (Part A)	(3) Submitted before end of Lab 10
Lab 11 – DNA Sequence Analysis II (BLAST) and Capstone Research Project Data Analysis	(1) In-Class Prelab quiz, Gradebook/PreQ9 (2) In-Class Post-lab quiz, Gradebook/Barcode, bar 3 (3) In-class Canvas individual assignment – DNA sequence analysis (Parts A and B), Gradebook/Barcode, bar 4	(3) Submitted at end of Lab 11
Lab 12 – BRL117 Semiannual Student Research Symposium – Capstone Research Project Oral Presentations	Capstone activities: (1) Abstract (2) Final paper (3) Presentation (4) Team grade (individual HW)	(1-3) See deadlines in the Lab Manual (4) 48 hours after attending Lab 12
Extra Credits	1. Complete course surveys 2. Attend, participate, and complete activities in your lecture lab section for the Career Readiness Seminar Series	

Academic Integrity Policy

Students should be familiar with and adhere to the [Rutgers Academic Policy on Academic Integrity](#).

- **Midterm Practical Exam:** The exam runs Monday through Thursday. Any communication among students about the practical questions, modality, materials, or equipment used during the practical week is a violation of academic integrity and will be reported to the Office of Student Conduct.
- **Course Materials:** All course materials are subject to copyright. You are not permitted to distribute or sell them (S-1803, Rutgers U., 2018). Review the [Libraries' website on copyright for students](#).
- **Honor Pledge:** *"On my honor, I have neither received nor given any unauthorized assistance on this examination/assignment."* This pledge must be acknowledged on all graded activities submitted in person or through Canvas.

Artificial Intelligence (AI) Policy

In concert with Rutgers' Code of Conduct, which requires that all work submitted is the student's own and created without the aid of impermissible technologies, this course promotes learning and critical thinking without reliance on unauthorized technology. Using AI tools (such as ChatGPT or others) to generate text or content is NOT permitted at any stage of the writing process on any assignment, including the capstone research project.

Each student is responsible for ensuring that submitted work is their own and reflects their understanding of the material. Using AI tools to generate content — including outlines, papers, data graphs, result interpretations, or presentation slides — and submitting it as your own work is a form of academic dishonesty subject to the Student Code of Conduct.

If you have questions about the ethical and responsible use of AI tools, please consult Dr. Torres before submitting your work.

Student Support and Mental Wellness

- [Student Success Essentials](#)
- [Student Support Services](#)
- [The Learning Centers](#)
- [The Writing Centers \(Tutoring and Writing Coaching\)](#)
- [Rutgers Libraries](#)
- [Office of Veteran and Military Programs and Services](#)
- [Student Health Services](#)
- [Counseling, Alcohol and Other Drug Assistance Program & Psychiatric Services \(CAPS\)](#)



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