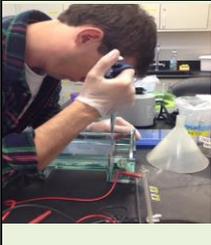


Course Syllabus

<p><i>Biological Research Laboratory</i></p> <p>01:119:117, 2 credits</p>	<p>Dr Mónica Torres</p> <p>Course Director Rutgers University Busch Lab Center Office 123b 663 Hoes Lane West Piscataway, NJ 08854</p>	
	<p style="text-align: center;">Contact Information</p> <p>Course email account: biolab@dls.rutgers.edu</p> <p>To contact Dr Torres, please use biolab@dls.rutgers.edu</p> <p>Make up lab account: brlmu@dls.rutgers.edu</p> <p>Office hour: by appointment</p>	

Prerequisites

General Biology 119:115 and CO-REQ General Biology 119:116.

Course Description



Biological Research Laboratory 01:119:117 (**BRL117**) is the laboratory component of the first year life science course required of all Life Science majors.

This is a CORE course required of all life science majors. It is appropriate for students who plan on attending a graduate or professional school in the life or health sciences.

The goal of this course is to encourage students to learn biology in a hands on, scientific manner. The course is organized into three main parts – the first part focuses on local aquatic ecosystems, the next section focuses on DNA barcoding, and in the final part, students work in teams to develop a capstone research project. The laboratory is structured such that there are connections between the activities conducted throughout the semester. In one lab, students will use morphological characters to identify an organism they collected during a field trip to a local freshwater environment. In the following weeks students will learn more about the same organism by using a DNA Barcoding approach. Students will extract and purify genomic DNA, amplify a DNA marker by Polymerase Chain Reaction, and analyze the products by gel electrophoresis. As a last step in the DNA Barcoding project, students will use basic bioinformatics tools to analyze and identify their unknown DNA sequences and obtain information about the species from which the sequences came from. Students will therefore gain an appreciation of how one experiment builds on another and how procedures they do at one step will affect their results and interpretations at another step. Throughout the semester students will hands-on learn techniques, they will learn to collect, analyze and interpret data and learn approaches necessary to fully understand biological systems.

The Capstone Research Project is a multi-week student-designed research project that will be completed in teams. Teams are assigned during the first week of class and they will remain the same for the entire semester. The capstone research project will offer students the opportunity to apply what they have learned about the process of science during the earlier laboratories to formulate and test their own hypothesis while stressing the development of written and oral presentation skills.

General Biology Office – BRL 117 course

Dr. Transue (Director General Biology Programs), Dr. Torres-(Lecturer and Course Director)

e-mail address: biolab@dls.rutgers.edu – messages to other addresses or phone numbers will be ignored.

Douglass Biological Sciences Building (DBB), Room 106, open Tuesdays - 10-12 and Wednesdays - 10-11:30am, phone 848-932-9368
Busch Laboratory Center (BLC), Room 129, open Mondays - 1-3:30 pm and Tuesdays - 1-3pm, phone 848-445-0778

BRL117 Satisfies Departmental Learning Goals

- I. To acquire the appropriate factual and conceptual knowledge that provides students with a foundation to further their education and career in the areas of life science or health science. Students will be able to demonstrate basic knowledge (ex. identify, define, explain...) of the concepts, practices and principles that comprise the biological sciences.
- II. To develop data analysis and statistical reasoning skills that prepares students for a society increasing reliant on the use of data and information. Students will be able to interpret/evaluate patterns in data presented in tables, figures, and graphs as well as be able to organize, summarize and present data.
- III. To develop the ability to use scientific reasoning as embodied by the structured process commonly known as the scientific method to empower students with the ability to generate and refine knowledge. Students will be able to evaluate and apply the practice of science.
- IV. To develop critical thinking and problems solving skills appropriate to prepare students to evaluate, synthesize and generate knowledge that provides them with a competitive advantage to adapt to an evolving, global, and knowledge based society. Students will be able to demonstrate application of higher order thinking (ex. classify, diagnosis, evaluate, synthesize, hypothesize...). Students will develop an understanding of not only the connections within biology but also the connections between biology and other scientific disciplines.

BRL 117 Learning Goals

- I. Students will acquire the appropriate factual and conceptual knowledge on which they can further their immediate education and to manage a career.
- II. Students will understand and develop an appreciation for research as the basis of scientific study.
- III. Students will understand and appreciate the process of science and acquire the ability to use scientific reasoning as embodied by the structured process commonly known as the scientific method.
- IV. Students will understand biology as a framework of related concepts and appreciate not only the connections within biology, but also the connections between biology and other scientific disciplines.
- V. Students will learn to work within a team to develop and test a scientific hypothesis using the scientific method.

Course Canvas site**Course materials information:**

Required Texts: Campbell Biology, 10th ed.; Reece et al. ISBN: 9780321775658- Pechenik, J. A. 2016. Guide to Writing about Biology book (9th edition)

Lab manual: will be provided

General Biology Office – BRL 117 course

Dr. Transue (Director General Biology Programs), Dr. Torres-(Lecturer and Course Director)

e-mail address: biolab@dls.rutgers.edu – messages to other addresses or phone numbers will be ignored.

Douglass Biological Sciences Building (DBB), Room 106, open Tuesdays - 10-12 and Wednesdays - 10-11:30am, **phone 848-932-9368**
Busch Laboratory Center (BLC), Room 129, open Mondays - 1-3:30 pm and Tuesdays - 1-3pm, **phone 848-445-0778**

Weekly schedule:

1. Lecture sections (lecture sections are mandatory, lecture will meet once a week for 1 hour 20 min)

- Busch campus- Busch Lab Center lab sections: Wednesday 1:40-3:00pm, Allison Road Classroom, room ARC103.
- Cook/Douglass campus- Biological Sciences Building (DBB) lab sections: Wednesday 12:35am-1:55pm, Hickman Hall, room Hick101.

2. Laboratory sections (lab sections are mandatory, lab sections will meet once a week for 4 hours)

- Cook/Douglass lab sections: at Biological Sciences Building (DBB), Building Number: 8304.
- Busch lab sections: at Busch Lab Center (BLC), Building Number: 3692.

3. Walk-in Practice Sessions (attendance is optional)

See Course Canvas site

Exams

There will be a **midterm exam** that has two parts: a midterm **written portion** that will be a common hour exam with a multiple choice question format and a midterm **practical portion** with hands-on activities (see course policy for full description). The midterm exam is scheduled during the week of Lab 9 on Wednesday, exam period 9:40-10:40pm (exam rooms and time will be communicated to students through Canvas the week before the exam).

There will be a cumulative **final exam** including all concepts covered in all the lecture and lab classes. The final exam format will be multiple choice questions and the exam will be scheduled during the final exam period (8:00 PM - 10:00 PM, date, exam rooms and time will be communicated to students through Canvas the week before the exam).

Course Structure and Requirements *(please see course policy for a full description)*

1. Attend a weekly laboratory section (4 hours) and lecture (1 h 20 min). Attendance and participation are mandatory for laboratory sections and lecture.
2. Acknowledge and be familiar with the course policy (including dress code and lab safety).
3. Students are required to read the lab manual, lecture notes and all other assigned reading material before attending lab.
4. Students must bring their lab manual to class (lab and lecture).
5. Students will be assigned to work in teams of 3-4 students during the first lab class. Teams will remain the same for the rest of the semester. **Students are required to work in their assigned teams** and to fully collaborate and interact with each other to complete team activities.
6. Students will develop a capstone research project working in teams.
7. Students will attend a field trip to collect samples during the week of lab 3.
8. Students should expect weekly individual assessments (in class assessments such as quizzes and Think Pair Share activities) and homework assignments.
9. Make up laboratory offered on Friday morning the same week of the missed lab.
10. Students are required to deliver a capstone research oral presentation.

General Biology Office – BRL 117 course

Dr. Transue (Director General Biology Programs), Dr. Torres-(Lecturer and Course Director)

e-mail address: biolab@dls.rutgers.edu – messages to other addresses or phone numbers will be ignored.

Douglass Biological Sciences Building (DBB), Room 106, open Tuesdays - 10-12 and Wednesdays - 10-11:30am, phone 848-932-9368
Busch Laboratory Center (BLC), Room 129, open Mondays - 1-3:30 pm and Tuesdays - 1-3pm, phone 848-445-0778

Grading *(please see course policy for a full description)*

The Course Grade will be based on the following distribution:

1. **Midterm Exam (25%):** the midterm exam has two components, (1) a common hour exam with Multiple Choice Questions covering lecture and lab topics and (2) a practical exam with hands on activities. All tools, instruments and materials used in lab may be part of the practical exam setup.
2. **Final Exam (15%):** a cumulative common hour exam with Multiple Choice Questions.
3. **Weekly Assignments (20%):** homework activity completed individually.
4. **Lab Work (10%):** will include weekly individual and team assessments, lecture clicker questions and in class assessments.
5. **Department (5%):** will be based on laboratory participation, punctuality, collaboration, professional behavior.
6. **Capstone Research Project (25%):** there will be several graded activities related to the team capstone research project, proposal, scientific paper and oral presentation and team work.

Academic Integrity Policy *(please see course policy for a full description)*

Students must read and adhere to the Rutgers University Policy on Academic Integrity (https://slwordpress.rutgers.edu/academicintegrity/wp-content/uploads/sites/41/2014/11/AI_Policy_2013.pdf) In accordance with University policy, any violation of academic integrity standards must be reported to the Office of Student Affairs. We have very specific rules in Biological Research Laboratory.

Accommodations *(please see course policy for a full description)*

Students requesting accommodations please visit: <https://ods.rutgers.edu/students/applying-for-services> and Office of Disabilities Services: <https://ods.rutgers.edu/>.

General Biology Office – BRL 117 course

Dr. Transue (Director General Biology Programs), Dr. Torres-(Lecturer and Course Director)

e-mail address: biolab@dls.rutgers.edu – messages to other addresses or phone numbers will be ignored.

Douglass Biological Sciences Building (DBB), Room 106, open Tuesdays - 10-12 and Wednesdays - 10-11:30am, phone 848-932-9368
Busch Laboratory Center (BLC), Room 129, open Mondays - 1-3:30 pm and Tuesdays - 1-3pm, phone 848-445-0778