Biology 3103 : Ecology Laboratory

Stephen Cook & Dr. Robert Doyle

Fall 2018

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Office Hours: MTu 9:00-11:00am (Cook), or by appointment

Office: C453.R (Cook), C419 (Doyle)

Class Hours: 2:00-6:15

Class Room: A222

Course Objectives

The goal of this lab is to develop the student as a scientist by exposure to basic research methodology in the field of ecology. You will

1. develop understanding of ecology as a scientific discipline, and

2. become familiar with some common methods used by ecologists (including field, laboratory, and data handling practices).

General information

Ecology is synonymous with field research - barring dangerous conditions (e.g., lightning) we will be outdoors if the planned lab is outdoors. Rain or shine! Wearing clothes not suited to field conditions will not be considered a valid excuse to not participate in the lab, so dress appropriately.

In the lab, university policy is that you must wear closed-toe shoes and long pants. Pay attention to the weather and dress appropriately for outdoor conditions! For the wet labs I would wear old jeans or quick-dry pants/shorts. Shorts could be fine- but we may be wading through vegetation (scratchy). Old tennis shoes are highly recommended. You will not be allowed to wade barefoot (i.e., you will not participate in that lab, and lose participation points). More specific info will be provided for each outdoor lab.

If you ever have questions or concerns, please do not hesitate to email either Stephen (preferably) or Dr. Doyle. We generally respond quickly to emails, with the exception of the evening before lab reports are due (Stephen will respond to report questions up untill 5:00pm the day before the assigment is due). Please take advantage of office hours, and we are always happy to arrange alternative times to meet if the posted hours do not work with your schedule.

Laboratory/field activities

It is important that students be aware that participating in laboratory activities carries the risk, however small, of injury. Should you become injured during activities in this class, be aware of the following:

- Notify your instructor immediately if you are injured or exposed to a chemical. Ask your instructor to provide the chemical safety data sheet (SDS) to take with you.
- The Student Health Center can treat minor physical injuries such as cuts, burns, etc. The Health Center is open during campus business hours. After-hours medical care should be sought at an off-campus emergency care facility.
- The Health Center does not provide emergency care for eye injuries or chemical exposures. In such cases, treatment should be sought at an emergency care center.
- The nearest 24/7 emergency care center is Premier located at 221 N. Jack Kultgen Expy (254) 537-9452. Other nearby ERs include BSWMC Hillcrest and Express ER.
- Depending on the type/extent of injury, an ambulance may be requested.
- Medical expenses incurred as a result of a laboratory injury, including ambulance transport, are the financial responsibility of the student.

Grading

Point breakdown

- **72 points** - 6 lab reports at 12 points each

- **18 points** - 6 R scripts at 3 points each

- **10 points** - 2 field trips at 5 points each

Grading scale

Minuses (e.g. B-) will not be given.

Points	Letter grade
90.0-100	A
87.0-89.9	B+
80.0-86.9	B
77.0-79.9	C+
70.0-76.9	C
60-69.9	D
<59.9	F

Lab reports

See below.

R scripts

R is a simple programming language that scientists in a wide variety of fields use for data analysis, graphing, and report generation. If computer programming is completely foreign to you, don't worry! You will be given everything you need for this lab.

You will turn in a .rmd file with each lab report, which will include all calculations, data analysis, and graph generation.

Field trips (2x)

Field trips will involve attendance as well as active participation, which may include, for example, taking notes or completing a worksheet.

Course Policies

Absences

As this is a lab (and thus an experienced-based) course, it is imperative that you make it to class. Keep in mind that it is very important to be on time, as we will frequently be leaving the lab to collect data in the field. Tardiness is not a valid excuse for missing class. Attendance policy is detailed in the Baylor University student handbook. You will be automatically dropped from the class if you have 4 unexcused absences. Missing a lab is forfeiture of the points available for that day. For labs that take up two days, missing one of the labs will result in a 50% deduction on the lab report. For an absence to be excused, the instructor must receive documentation (e.g., doctor's note or chaplain's note). Students with excused absences may be given alternate assignments.

CANVAS

We will use Canvas to post data, report guidelines, readings, and communications about the lab. You will also use Canvas to submit lab reports. Each report will be submitted to Turnitin, and will be graded and scored on Canvas. Please review any comments/suggestions in order to improve your lab reports. We suggest you check Canvas each week before coming to class for any updated announcements.

Cell phones

Please do not use your cell phone in lab unless instructed to do so. Used responsibly, they can be an excellent tool to record data or steps in the experiment (pictures or notes). If you chose to bring your cell phone to the field, we are not responsible for them!

Academic integrity

Plagiarism or any form of cheating involves a breach of student-teacher trust. This means that any work submitted under your name is expected to be your own, neither composed by anyone else as a whole or in part, nor handed over to another person for complete or partial revision. Be sure to document all ideas that are not your own. Instances of plagiarism or any other act of academic dishonesty will be reported to the Honor Council and may result in failure of the course. Not understanding plagiarism is not an excuse. You may use online resources to study for this course, but you must do so in ways that are consistent with all aspects of the Baylor University Honor Code (see, specifically, Section III.C.12 and Section III.C.16). As a Baylor student, I expect

you to be intimately familiar with all aspects of the Honor Code, which can be found at this link: http://www.baylor.edu/honorcode/.

Translation... If you use outside resources, please cite them appropriately, and do not copy directly either from sources or the lab handouts. Also, do not copy from current/previous students' lab reports.

Disabilities policy

Any student who needs academic accommodations related to a documented disability should inform me immediately at the beginning of the semester. You are required to obtain appropriate documentation and information regarding accommodations from the Office of Access and Learning Accommodation (OALA). Contact Information: (254) 710-3605 - Paul L. Foster Success Center, 1st floor on the East Wing of Sid Richardson.

Title IX statement

Baylor University does not discriminate on the basis of sex or gender in any of its education or employment programs and activities, and it does not tolerate discrimination or harassment on the basis of sex or gender. This policy prohibits sexual and gender-based harassment, sexual assault, sexual exploitation, stalking, intimate partner violence, and retaliation (collectively referred to as prohibited conduct). For more information on how to report, or to learn more about our policy and process, please visit www.baylor.edu/titleix. You may also contact the Title IX office directly by phone, (254) 710-8454, or email, TitleIX_Coordinator@baylor.edu.

Tentative lab schedule

Date	Lab	What is due?
Aug 20/21	Introduction, safety, lab reports	Nothing
Aug 27/28	LAB 1: Cemetery demography / golden eagle lab	R installation
Sep 3/4	LABOR DAY	Do something ecological
Sep 10/11	LAB 2: Photosynthesis	Nothing
Sep 17/18	Field trip no. 1 / LAB 2 discussion	LAB 1
Sep 24/25	LAB 3: Vegetation transects	LAB 2
Oct 1/2	LAB 4: Biodiversity (sampling)	Nothing
Oct 8/9	LAB 4: Biodiversity (processing)	LAB 3
Oct 15/16	Field trip no. 2	Nothing
Oct 22/23	LAB 5: Climate modeling	LAB 4
Oct 29/30	LAB 5: Climate modeling (group data)	Nothing
Nov 5/6	LAB 6: Trophic ecology	LAB 5
Nov 12/13	LAB 6: Trophic ecology	Nothing
Nov 19/20	THANKSGIVING FLEX DAY	Nothing
Nov 26/27	Field trip no. 3	LAB 6 (during final)

Lab report guidelines

Lab reports are due via electronic submission (Canvas) by the beginning of lab time on the due dates mentioned on the course schedule. It is the student's responsibility to turn in lab reports. Labs may be accepted late up to one week late and will receive a 30% reduction in score (maximum 70%), but will not be eligible for a rewrite. No labs will be accepted more than one week late unless special circumstances are approved by instructor or TA.

If you receive a failing score (< 70%) on a report, you have the opportunity to rewrite and re-submit the report for a maximum of 70%. This rewrite will be due one week from when the report is handed back. If you choose to take advantage of this, please carefully consider the comments/corrections on your graded report, and ask questions if necessary!

Reports will be scored by the rubric below.

Style and format for written report

Mirror your reports off the peer-reviewed studies we read in class. Points may be taken off the lab report for poor grammar, syntax, spelling, etc. Additionally, please be concise in your writing - a hallmark of good scientific writing is finding a way to clearly convey an idea in as few words as possible.

Introduction

Briefly give introductory material explaining the importance of the lab material (e.g., how it relates to ecology in general and why we care about the subject matter). Pay attention during the lab set up- the instructors will state most of what you need to know for this! At the end of the introduction, you must also include a specific null research hypothesis. You may also make a prediction about the Results based on information you've given in the Introduction - that is, you may state an alternate hypothesis. This alternate hypothesis should say whether you think there will be an effect, and in what direction that effect will occur.

1. Establish the question you are interested in with a general objectives statement: *"The objective of this study was to determine the effectiveness of the Lab Report Guidelines in aiding student success."*

2. Turn that question into a hypothesis that can be nullified with some degree of certainty: *"We tested the null hypothesis that students who read the Lab Report Guidelines, and those that do not, receive similar scores on their Lab Reports."*

3. Determine a plausible alternative hypothesis that your data could support if the null hypothesis is rejected: *"Our alternative hypothesis was that students who read the Guidelines would perform better than students who did not."*

Methods

Clearly summarize what was done in lab to address the hypothesis. The KEY points of all experimental design, data collection, and data analysis should be included. You will only learn 2 statistical tests - so tell us which one you used and how it was applied to the data to address your hypothesis.

Results

Summarize the data collected and the results used to address the hypothesis. The results in the text (in paragraph form) should be graphically represented - you will use the R programming language and the Rstudio program, **with appropriate labelling of axes and legends, if applicable.** Clearly state the results of the statistical test employed.

- Graphs and tables MUST have a detailed caption explaining the contents!
- Figures must have labeled axes that include the units (if appropriate)

Discussion

Explain if the null hypothesis stated in the introduction was rejected or supported (you should remind the reader what hypothesis you were testing). Describe what the Results mean in the context of your Introduction. While the Results section details *what* you found, the Discussion section should be dedicated to rationalizing *why* you think your data displayed these results.

Ecology Lab (BIO 3103) Report Grading Rubric. Fall 2018.

Student: _____

Aspect Being Evaluated	P	NI	A	AA	E
Active Participation: (1 point possible)	1				
Introduction: (1 point possible) • Works broad to narrow in focus? • Reviews what is known about subject? • Objectives statement? • Hypothesis statement?	0-1.0	1.0	1.6	1.8	2.0
Methods: (2 points possible) • Starts with general statement about methods employed? • Reports experimental design? • Reports data collection? • Reports data analysis?	0-1.0	1.0	1.6	1.8	2.0
Results: (4 points possible) • Reports results in text section? • Reports results graphically? • Figures have appropriate captions? • Reports results of statistical tests?	0-2.5	2.5	3.2	3.6	5.0
Discussion: (2 points possible) • Is/are the hypotheses clearly rejected or supported? • Rationale/clear explanation for your results?	0-1.0	1.0	1.6	1.8	2.0
General Comments:					

P = Poor, **NI** = Needs Improvement, **A** = Average, **AA** = Above Average, **E** = Excellent

Figure 1: Grading rubric for Ecology Lab of Fall 2018. Each section will be scored by the criteria provided under 'Aspect being evaluated', and points will total to 12 points.