BIOL 330 University of Victoria – Spring 2022
STUDY DESIGN AND DATA ANALYSIS

Instructor Dr. Terri Lacourse – tlacours@uvic.ca
Office hours: on Zoom by appointment

Lab Instructor Dr. Neville Winchester – winchest@uvic.ca

Lectures Tuesdays, Wednesdays, Fridays at 11:30 AM–12:20 PM

Labs Tuesdays, Wednesdays, Thursdays at 2:30–5:20 PM

Textbook Whitlock M. & Schluter D. 2020. The Analysis of Biological Data, 3rd Edition. Macmillan.

Software R and RStudio (available in UVic computer labs and for download at no cost)

Calculator a non-programmable calculator e.g., Sharp with model # starting "EL-510R"

Learning Objectives At the end of the course:
1. You understand the main principles of experimental design.
2. You are able to frame appropriate and testable hypotheses for a set of data.
3. You are able to analyze and interpret a set of data in a statistically sound way.

Assessment of Final Grades

Lab Assignments	40%	Five assignments, each worth 5 or 10%; see pages 2 & 3
Midterm Exam	20%	**Cumulative** and **closed-book**; February 16, 11:30 AM-12:20 PM
Final Exam	40%	**Cumulative** and **closed-book**; During Exam Period: April 11-29

Important Notes & Course Policies (*see page 3 for additional Policies that relate to the Lab*)

1) Students are responsible for having access to a reliable computer and internet connection. Refer to the **University's minimum technology requirements for students**: www.uvic.ca/systems/status/features/min-tech-requirements.php

2) A lockdown browser and Zoom may be required for exams. If so, advance notice will be given.

3) Students are not permitted to record lecture or lab sessions in audio or video formats. Live sessions may be recorded by the Instructors and posted on the course website.

4) **No supplemental exams are offered in this course**. If you miss the midterm exam (due to an emergency or medical reason), your final exam grade will be used, without penalty, in place of the missed exam in the final grade assignment.

5) **All assignments in this course are individual assignments, not group assignments**. All assignments must be the product of each student's individual efforts alone. Assignments will be monitored for cheating and plagiarism.

6) **All tests and assignments must be completed.** As per University regulations, students who do not complete all tests and assignments will be given a final grade of **N** and will not be permitted to write the final exam.

7) As per University regulations, students must achieve satisfactory standing in both the lecture and the lab. **To receive credit for the course, students must pass both the lecture and the lab.**

8) Students are responsible for keeping track of the grades they receive on exams, tests and assignments. Final grades will be assigned on the basis of the University's official grading scale with F and N as per university regulations.

LECTURE Schedule

Week of…	Major Lecture Topics	Textbook Chapters
Jan 10	Introduction; Types of data; Random sampling	1, Interleaf 2
Jan 17	Displaying & Describing Data; Estimating Uncertainty	2, 3, 4
Jan 24	Probability; Hypothesis testing; Frequency Data	5, 6, 7, Interleaf 3
Jan 31	Goodness-of-fit; Poisson Distributions; Contingency	8, 9
Feb 7	Normal distribution; Confidence intervals; Z-scores	10, 11
Feb 14	Testing means and variances; ***Midterm exam Feb 16***	11, 12
Feb 21	*Reading Break - No Lectures*	
Feb 28	Violating test assumptions; Non-parametric tests	13
March 7	Experimental design; ANOVA	14, 15, Interleaf 5 & 6
March 14	Correlation; Regression	16, 17, Interleaf 1
March 21	General linear models; Blocking; Factorial Designs	18
March 28	ANCOVA; Computer-intensive methods	13, 18, 19
April 4	Knowing which statistical test to use; Course Review	Interleaf 7

* The exact sequence of lecture topics is subject to revision as the course progresses.

LAB Schedule

Week of…	Lab #	Assignment Due Dates
Jan 10	*NO LABS.* Install R and RStudio on your computer for lab exercises & assignments.	
Jan 17	1. Introduction to R, Part 1	
Jan 24	2. Introduction to R, Part 2	
Jan 31	3. Graphing & Describing Data	**Lab 2 due Monday, Jan 31 by 1:00 pm PST**
Feb 7	4. Analyzing Categorical Data	
Feb 14	5. Getting Started with Numerical Data	**Lab 4 due Monday, Feb 14 by 1:00 pm PST**
Feb 21	*Reading Break - No Labs*	
Feb 28	6. Comparing Two Groups	
March 7	7. Data Transformation & Non-parametric tests	**Lab 6 due Monday, March 7 by 1:00 pm PST**
March 14	8. ANOVA	
March 21	9. Correlation & Regression	**Lab 8 due Monday, March 21 by 1:00 pm PST**
March 28	*NO LABS*	**Lab 9 due Thursday, March 31 by 1:00 pm PST**
April 4	*NO LABS*	

Lab Grading Scheme

Assignment for Labs 2 and 4	each worth 5%
Assignment for Labs 6, 8 and 9	each worth 10%

Important Notes on the Lab & Lab Policies

1) Students are not required to buy a lab manual for this course. All lab materials are available on Brightspace.

2) The focus of the lab is to practice implementation of study design principles and data analysis techniques. We will be using R and RStudio software for data analysis. These programs are available in the UVic computer labs and for download from the internet, at no cost, for use on your own computer. Note that R requires the user to write computer code to perform statistical analyses. RStudio provides a more user-friendly interface for analyses in R, and the lab materials have been written on the assumption that you will use R through the RStudio interface. However, you are welcome to use R as a stand-alone program.

3) **Students are not permitted to share lab materials including assignments and their answers with others or distribute them in any form** e.g., post online, on social media, etc.

4) **All assignments in this course are individual assignments, not group assignments**. All assignments must be the product of each student's individual efforts alone. Assignments will be monitored for cheating and plagiarism.

5) **Assignments that are submitted late will receive a grade of 0.** There are no late marks for assignments.

6) **All tests and assignments must be completed**. As per University regulations, students who do not complete all assignments will be given a final grade of **N** and will not be permitted to write the final exam.

Academic Integrity & Intellectual Property

The University has a strict Policy on **Academic Integrity**. All students are required to read and abide by this policy: *www.uvic.ca/calendar/undergrad/info/regulations/academic-integrity.html* Violations of academic integrity are considered serious and can result in significant penalties.

All course materials are the intellectual property of the Instructors. All course material is protected under copyright law, even if not marked with a ©. Students are not permitted to share or distribute course materials (e.g., lecture videos, slides, labs, assignments, exams, etc.) or post them online or on social media in any form at any time. Failure to comply with this is a violation of the University's policy on Intellectual Property and Copyright law. Violations may result in disciplinary action under the University's Non-Academic Misconduct policy.

Territorial Acknowledgement

We acknowledge and respect the lək̓ʷəŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.