TRINITY COLLEGE
NESC - 220 Statistics for Life Sciences (1 unit)
Class time/Room: CCAN 121 - 8:00-9:15 AM (Tue/Thurs)

Professor: Gayna Swart
Office Hours: Tue/Thur 9:20-10 AM
860-297-2350 | gswart@trincoll.edu

SYLLABUS

COURSE DESCRIPTION: (1 unit) This rigorous course is geared towards life science students and emphasizes applied statistical concepts, such as using simple experimental design, data collection and analysis, and presentation of results. Students will also gain knowledge of R computing software. Topics covered include probability, descriptive statistical methods (including measures of central tendency, variance) and graphical presentation and calculated using R. Elementary probability, inferential statistics and statistical tests are reviewed (estimation, hypothesis testing, sample size, power). The class will meet twice per week, on Tuesdays and Thursdays, from 8:00-9:15AM, in the computer lab CCAN 121. Prerequisites: College-level algebra.

COURSE MATERIALS / RESOURCES:

Textbook - We will be using "Introductory Statistics For Life and Biomedical Science" (First Edition) by Vu and Harrington (ISBN: 978-1500576691) as the text for the course. The book is available as a free download. Intro Stat for Life & Biomedical Sci. - openintro.org/go/?id=biostat0

Moodle - The Moodle site will be regularly updated with announcements, handouts, information, assignments, reading quizzes and other course resources.

Computing Software- The use of the R statistical environment with the RStudio interface (downloadable from http://rstudio.org) is thoroughly integrated into the course. RStudio is free software that can be installed using the version of R on your own computer (download information for R can be found at http://r-project.org). Running it as a client on your own machine may be an option.

Computer Lab - Your ID card should unlock the door to the computer lab. I will also provide extra time in the computer lab upon request.

Extra Help - I can help you with questions about the material, class schedule, problems, and resources, if asked at appropriate times (whether in class, email, in person, etc.), during office hours, or a scheduled individual appointment.

CLASS EXPECTATIONS AND POLICIES:

Student Conduct: All students are bound by the Trinity College Student Integrity Contract. Cases of dishonesty, plagiarism, etc., shall be reported, per the full statement of intellectual responsibility. Per the Statement: "Intellectual honesty is doing our own work and fully crediting the work of others if we use their ideas in our own work. Each student is responsible for knowing what constitutes intellectual honesty in every examination, quiz, paper, lab report, or academic exercise submitted for evaluation at Trinity College." Students are also bound by Trinity Community Standards which state that "We shall govern ourselves sensibly and support our peers so that they also behave accordingly. As socially responsible and intelligent adults, we shall take responsibility for our actions in social situations and shall conduct ourselves maturely and safely." Any student violating these standards of behavior will be dismissed from class, and the incident will be reported.

Attendance: I expect you to attend class. One absence during the semester is not unusual; having more than two is uncommon. Your participation is an important part of the learning process. If you cannot attend a particular class, I would appreciate the courtesy of advanced notice and an explanation for your absence. Class participation and attendance contribute to your final grade.

Collaboration: Much of this course will operate on a collaborative basis, and you are expected and encouraged to work together with a partner or in small groups to study, complete homework assignments, and prepare for exams. However, every word that you write must be your own. Copying and pasting sentences, paragraphs, or large blocks of R code from another student is not acceptable and will receive no credit or a penalty. ***No interaction with anyone but the instructor is allowed on exams or quizzes.***

Grading and Scores: Assignments will consist of four exams, lab homework, and quizzes. Students may question their grades (quiz, homework, or exams) through a form on Moodle. Your final grade for the course will be a weighted average as follows:

Exams: 80% (4 exams x 20% of your final grade)
Homework/Quizzes: 15%
Participation: 5%

Exams/Quizzes: All exams are closed notes/book, unless otherwise advised. All components of the exams are to be done independently, and no information regarding the exam should be shared among students. Make-ups for exams will not be possible and grades for missed exams are automatically 0 points. Any student wanting to replace their lowest exam grade may complete a project and presentation during the semester. Quizzes may not be made up and missed quizzes receive a score of 0, with the lowest score automatically being dropped. I expect all assignments to be submitted on time. Late work incurs a 10% /day penalty. *If you become ill or the victim of an emergency, please let me know within 48 hours.*

Schedule: The following outline lists each class date and gives the anticipated topic that will be discussed in that class. Any related reading assignments are also given for each class date (unless indicated otherwise, these are in the textbook.) I reserve the right to revise this schedule – updates will be posted on Moodle.

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DATE	TOPICS	LAB		HOMEWORK	
		Lab # (chapter-lab)	*Related Text Ch/Sec.*	*Read/Review*	*Due Date*
Chapter 1 - Intro to Data					
Tue 01/21/2025	Welcome; Syllabus; R; Moodle; Introduction to Statistics	*Lab 0*	*Install, tutorial, Lab 0*		
Thu 01/23/2025	Ch 1 - Basics & Data Types			1.1-1.5	1/28/2025
Tue 01/28/2025	Lab 1-1	*Lab 1-1 (sections 1-2)*	*1.1-1.2, 1.4, 1.6*	1.6-1.7	1/30/2025
Thu 01/30/2025	Ch 1 - Relationships Between Variables; Exploratory			2.1-2.2; Lab 1-2	2/4/2025
Chapter 2 - Probability					
Tue 02/04/2025	Ch 2 - Defining Probability/ Conditional Probability	*Review 1-2;Lab 2-1 (#1)*	*2.1*		2/6/2025
Thu 02/06/2025	Quiz & Labs	*Lab 2-2 (#1&3)*	*2.2.1-2.2.4*		
Tue 02/11/2025	Catch-up & Review (Lab 1-1: Q1 & Q3)				
Thu 02/13/2025	Exam 1 (Ch 1 & 2)				
Chapter 3 - Random Variables					
Tue 02/18/2025	Ch 3 - Random Variables; Binomial Distribution	*Lab 3-1, 3-2*	*3.1-3.2*	3.1-3.3	2/25/2025
Thu 02/20/2025	Trinity Day - No Class				
Tue 02/25/2025	Ch 3 - Normal	*Lab 3-1, 3-2 continued*			2/27/2025
Thu 02/27/2025	Ch 3 - Poisson; Quiz 3	Lab 3-2 #5			3/4/2025
Chapter 4 -Inference					
Tue 03/04/2025	Ch 4 - Inference - Variability of Estimates	*Lab 4-1, 4-2*	*4.1-4.2*	4.1	3/6/2025
Thu 03/06/2025	Ch 4 - Confidence Intervals & Hypothesis Testing	*Lab 4-3, 4-4*	*4.31-4.3.2; 4.3.3-4.3.*	4.2-4.3	3/11/2025
Tue 03/11/2025	Review				
Thu 03/13/2025	Exam 2			Ch 3 - 4	
Tue 03/18/2025	Spring Vacation				
Thu 03/20/2025	Spring Vacation				
Chapter 5 - Inference for Numerical Data					
Tue 03/25/2025	Ch 5 - ANOVA	*Lab 5-1, 5.2*		5.1; 5.2-5.3	3/27/2025
Thu 03/27/2025	Ch 5 - Single Sample Inference - Two Sample Inference Tests	*Lab 5-3, 5-4, 5-5*	*5.6*	5.4-5.5	4/1/2025
Tue 04/01/2025	ANOVA/t-test lab				4/3/2025
Thu 04/03/2025	Power Calculations				4/8/2025
Tue 04/08/2025	Review				
Thu 04/10/2025	Exam 3			Ch 5 & Experimental Design	
Chapter 8 - Inference for categorical data					
Tue 04/15/2025	Ch 8 - Single Proportion, Two Proportions, Chi Square	*Lab 8-1 & Lab 8-2*	*8.1-8.3, 8.4*	8.1-8.3, 8.4	4/17/2025
Thu 04/17/2025	Chi Square Lab				4/22/2025
Chapter 6 - Simple Linear Regression					
Tue 04/22/2025	Linear Regression & Logistic Regression Overview				
Thu 04/24/2025	Make-up Presentations - Linear and Logistic Regression cont'd				
Tue 04/29/2025	Review				
Tue 05/06/2025	Final Exam: 9:00 AM - 12:00 PM			Ch 6, 8	