STA 6093 Introduction to Applied Statistics for Agricultural and Life Sciences (3 credits)
Spring 2026
Time and Location: **Online**

THIS COURSE USES THE PROGRAMMING LANGUAGE R EXCLUSIVELY. YOU <u>DO NOT</u> NEED TO KNOW R COMING INTO THE COURSE, BUT YOU WILL KNOW IT WHEN YOU ARE FINISHED

Instructors:
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Teaching Assistants
Head TA: Fernando Miguelena (fmiguelena@ufl.edu)
Grading TA: Leo Haneda (hanedaleo@ufl.edu)

Online Office hours: Dr. Baiser: **Thursday 12pm-1 pm**
                                        TA, Fernando Miguelena: **TBD**

Date and location of final exam: All final exams will be taken on <mark>**Monday, April 27th, 2026**</mark>

- **On-campus students** (class # 14248/ section ALAC) will take the final **in-person** in **CALS Computer Classroom - 3086 McCarty Hall B**

- **Students at RECs** (class # 14527/ section REC) will take the exam **in-person at their REC.**

- **Remote students** (class # 14527/ section SELF and class# 23697/section FRF) will take the final exam **online through Honorlock.**

Course Description:

This course provides students with a conceptual and practical understanding of the application of statistics in the agricultural and life sciences. This is an **online course** that will use a combination of lectures, programming demonstrations, data exercises **using the programming language R**, and primary literature to teach introductory statistics at the graduate level. **This course is NOT a "go at your own pace" course. Each module must be completed in a specific week (see Course learning objectives and weekly schedule below)**.

Course goals:

1) Learn the programming language R

2) Familiarize students with the foundations of statistical analysis

3) Teach students basic statistical analysis and data management

4) Prepare students for advanced statistics courses they will take throughout their graduate career

Course learning objectives:

Week	Module	Learning objectives
1	Broad overview of statistics	- Describe the role of statistics in applied science. - Identify the difference between a sample and the population. - Describe observational studies and its weaknesses and strengths. - Describe experimental studies and its weaknesses and strengths.
2	Reproducible science / R	- Describe the advantages of using a scripting computer language for statistical analysis. - Define reproducible science. - Download R and R studio. - Know how to import and export data in R.
3	Knowing your data and Summary Statistics	- Describe the importance of querying and visualizing data. - Be able to query and summarize data. - Calculate and understand the meaning of summary statistics (measures of location and spread).
4	Visualizing your data and graphing your results	- Utilize graphical techniques to visualize your data - Identify outliers using graphical techniques - Create effective and innovative graphical displays of results
5	Random variables and probability distributions	- Define what is a probability and a probability distribution - Describe the characteristics of the normal distribution. - Explain why the normal distribution is so important
6	Hypothesis testing	- Define and develop a null hypothesis - Define and develop alternative hypothesis. - Identify when a result is "statistically significant". - Define precisely what a p-value is and how it is computed to reach the conclusion that a difference is not due to chance. - Identify Type 1 error - Identify Type 2 error
7	Linear models	- Mathematically define a linear model. - Describe the four assumptions of linear models. - Conduct diagnostic tests for assumptions. - Transform data to meet the assumptions of linear models - Recognize the limitations of data transformations.

8	T-tests	• Know when a t-test is appropriate and which type of t-test to use (e.g., paired, two sample, one sample t-tests). • Apply a t-test to data. • Understand the problems associated with multiple statistical testing.
9 & 10	ANOVA	• Identify the types of data and experiments that an ANOVA is appropriate for. • Run an ANOVA in R • Calculate an F-statistic. • Test hypothesis with ANOVA • Interpret an ANOVA table and report ANOVA statistics. • Graphically display ANOVA results
11	Simple regression	• Know when regressions are appropriate • Run a regression in R • Be able to interpret and report regression outcomes. • Graphically display regression results
12	Multiple regression	• Identify the types of data and experiments that multiple regression is appropriate for. • Run a multiple regression in R • Detect multicollinearity among variables in multiple regression. • Interpret and graphically display interaction terms in multiple regression and ANOVA. • Define AIC scores. • Select models using stepwise procedures in R.
13	Categorical data analysis	• Identify the types of data and experiments that categorical data analysis is appropriate for. • Construct and interpret a contingency table. • Calculate and interpret a chi-square statistic.
14	Future classes/analyses	• Select the appropriate analyses for a given data type. • Know future options for quantitative topics and courses.
Final exam		

Assignment Types:

There are 4 types of assignments in this course:

1) **Activities (graded):** These are assignments that build on a module's content. They often involve finding and interpreting outside resources (e.g., popular science articles, scientific articles). **These assignments are present in select modules and thus are not due every week.** When a module does have an activity, it will be due on Sunday at 11:55pm (i.e., the end of the week's module)

2) **Conceptual Quizzes (graded):** These quizzes cover the basic concepts learned in each module and are open from Friday at 1:00 AM through the following Sunday at 11:55 PM (a 10-day period). **Once you begin the conceptual quiz, you have 1 hour to complete it.**

3) **Data Quizzes (graded):** In the data quizzes, you will analyze data in R using the analyses you learned in each module. The data quizzes are open from Friday at 1:00 AM through the following Sunday at 11:55 PM (a 10-day period). Once you begin the quiz, you have 3 hours to complete it.. **Once you begin the data quiz, you have 3 hours to complete it.**

4) **Discussion board (all <u>ungraded</u> except for Target discussion)**: We expect students to engage and provide meaningful contributions (posting questions, answers, or additional resources) to the weekly discussion boards. **<u>The discussion board is an opportunity for you to help yourself but will not count against you in any way.</u>**

Due Dates for Assignments:

Assignment	Due
Discussion board	---
Activities	**Sundays 11:55 pm**
Conceptual Quizzes	**Sundays 11:55 pm**
Data Quizzes	**Sundays 11:55 pm**

Grading:

Grading will be based on weekly quizzes (50% of the overall grade), activities (25% of the overall grade), and a final exam (25% of the overall grade). **Note that modules with more content have more quiz questions and are worth more points.**

Point range (%)	Letter Grade	GPA equivalent
93.0 – 100	A	4
90.0 – 92.9	A-	3.67
87.0 – 89.9	B+	3.33
83.0 – 86.9	B	3
80.0 - 82.9	B-	2.67
77.0- 79.9	C+	2.33
73.0 – 76.9	C	2

70.0 - 72.9	C-	1.67
67.0– 69.9	D+	1.33
63.0- 66.9	D	1
60.0 - 62.9	D-	0.67
< 60	E	0

Our philosophy is that you just learn by doing, thus this course is heavily based on working with data.

***We will drop your lowest grade for 1 quiz OR assignment (not including the final exam) ***

List of required and recommended materials
Textbooks (recommended):
- Gotelli NJ and AM Ellison. "A primer of ecological statistics", Second Edition. *Sinauer, Sunderland, Massachusetts, USA* (2013).
- Crawley, Michael J. "Statistics: an introduction using R." *Wiley,* (2005)

Software (Required):
- R, freely available at http://www.r-project.org
- A text editor, such as RStudio (http://www.rstudio.com/)

Pre-requisites: One undergraduate course in statistics

Class attendance: You are required to complete each module component by the due date. If you are an on-campus or REC international student, you are required to be present for the final exam. **If you need to miss class due to field work or conferences, you must inform the instructor at least 2 weeks in advance.**

Class participation: You are expected to participate in and class discussion boards via the internet.

IT help
A hardwired internet connection (not wireless) is highly recommended when working on quizzes and/or submitting assignments. If you have problems with CANVAS, you should contact:
 a) Staff in the SFRC online programs office by posting a question in the appropriate forum
 b) UF computing help desk "e-Learning Support Services" (learning-support@ufl.edu or (352) 392-4357 -> option 2 (Students))
These resources are also listed in the "Help!" tab on the left-hand side of Canvas.

Problems with R:
99.9% of problems with R should be solved on the discussion board. In the off chance that no one on the discussion board can solve your problem, email your T.A.

Policies and Requirements

This course plan and syllabus are subject to change in response to student and instructor needs. Any changes will be clearly communicated in advance through Canvas.

Attendance, Late Submissions & Make-up Requests

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/.

Use of Artificial Intelligence

Use of generative artificial intelligence is **not permitted without written permission from the instructor**. Use of generative artificial intelligence (including but not limited to Chat GPT) without permission, could result in a grade penalty. The university policy on plagiarism and the Honor Code (below) applies to the use of artificial intelligence

Communication Courtesy and Professionalism

Just as in any professional environment, meaningful and constructive dialogue is expected in this class and requires a degree of mutual respect, willingness to listen, and tolerance of opposing points of view. **Respect for individual differences and alternative viewpoints will be maintained in this class at all times.** All members of the class are expected to follow rules of common courtesy, decency, and civility in all interactions. Failure to do so will not be tolerated and may result in loss of participation points and/or referral to the Dean of Students' Office.

Semester Evaluation Process
Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at:
https://gatorevals.aa.ufl.edu/students/.

Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at: https://gatorevals.aa.ufl.edu/public-results/.

Academic Honesty Policy
UF students are bound by The Honor Pledge which states "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. See the UF Conduct Code website for more information. If you have any questions or concerns, please consult with the instructor or TAs in this

class. It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration
of disciplinary action. For more information regarding the Student Honor Code, please see: https://policy.ufl.edu/regulation/4-040/

Inclusive Learning Environment
This course embraces the University of Florida's Non-Discrimination Policy, which reads, *The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act.*

Privacy Statement
Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

In-class recordings
Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal education use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and deliver by an instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentation such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or guest lecturer during a class session.

Services for Students with Disabilities:
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. See the

"Get Started With the DRC" webpage on the Disability Resource Center site https://disability.ufl.edu/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources

Whole Gator App
The Whole Gator and website and app connects UF students with resources dedicated to supporting overall health and well-being. In addition to many of the resources below it also has strategies to practice self-care. https://one.uf.edu/whole-gator/topics

Health and Wellness
- U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.
- Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non- crisis services.
- Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.
- University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).
- UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.
- GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.
- Student Success Initiative, http://studentsuccess.ufl.edu

Academic Resources
- E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.
- Career Connections Center: Reitz Union Suite 1300, 352-392- 1601. Career assistance and counseling services.
- Library Support: Various ways to receive assistance with respect to using the libraries or finding resources. Call 866-281-6309 or email ask@ufl.libanswers.com for more information.
- Teaching Center: 1317 Turlington Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.

- Writing Studio: Daytime (9:30am-3:30pm): 2215 Turlington Hall, 352-846-1138 | Evening (5:00pm-7:00pm): 1545 W University Avenue (Library West, Rm. 339). Help brainstorming, formatting, and writing papers.

Student Complaints
- Academic Complaints: Office of the Ombuds; Visit the Complaint Portal webpage for more information.
- Enrollment Management Complaints (Registrar, Financial Aid, Admissions): View the Student Complaint Procedure webpage for more information.
- Residential Course: https://www.ombuds.ufl.edu/complaint-portal/
- Online Course: https://pfs.tnt.aa.ufl.edu/state-authorization-status/#student-complaint

Food pantry

The Alan and Cathy Hitchcock Field & Fork Pantry is a free resource available to UF undergraduate, graduate, and professional students, faculty, and staff who experience food insecurity. Food insecurity may mean you have faced challenges in meeting your needs in terms of quantity and nutritional quality of food. For example, food insecurity may look like eating ramen because you can't afford foods you consider healthy, nutritious, or appropriate for yourself or outright skipping meals or eating smaller meals.

If you're not sure whether you fit the criteria, visit anyway. When you visit, bring UFID or mobile credentials. The Pantry offers more than just canned food. Each week, guests can secure fresh seasonal produce, frozen meat, vegan options, feminine hygiene products, and select toiletries while supplies last.

The Pantry assures guests, potential and current, that accessing services like the Pantry does not reflect one's self-worth, nor does it take resources from someone "more deserving" or "more in need" than oneself.

The Pantry is located between Marston Science Library and McCarty Hall, across from the HUB, on the University of Florida Gainesville campus. Visit pantry.fieldandfork.ufl.edu for more information, including current hours. Volunteers are also needed each semester. If you are looking for a way to give back or find community, volunteer at the Pantry. Additional Campus Assistance & Resources for Empowerment (CARE) resources offered through the Dean of Students Office can be found at care.dso.ufl.edu.