AEB4931: Special Topics in FRE (Agricultural Data Analysis with R) – 1 Credit Hour

Course Time and Location: Mondays -- 4th Period (10:40 am – 11:30 am) in McCarty Hall B 3086 (CALS Computer Lab)

Instructor information: Dr. Misti Sharp, Instructional Associate Lecturer and Undergraduate Coordinator, Food and Resource Economics.

Office Hours: Wednesdays and Fridays from 9:00 - 10:00 am, Thursdays from 1 – 2:30 pm and by appointment, Office: McCarty Hall A, room 1189; Email: mistisharp@ufl.edu

Course Description: This course is designed to guide students through how to prepare, clean, and visualize data using Microsoft Excel and RStudio. It follows the topics of an intermediate statistics class building up to hypothesis testing, visualizing relationships among variables, and finally creating regression models utilizing the free packages within the RStudio and Excel computational environments.

Co-Prerequisites: You must be enrolled in AEB3550 or have taken AEB3550 (or equivalent course such as QMB3250) prior to enrolling in this special topics course. It is departmentally controlled so please reach out to the FRE advisor to be added into the course (FRE-advising@ufl.edu).

Expected Student Learning Outcomes: After the successful completion of this special topics course, a typical student should be able to:

Professional Development Learning Objectives:

- Identify different types of data and appropriate statistical methods;
- Analyze a data set using tools provided in excel and R/RStudio;
- Interpret statistical output to aid in economic decision making;
- Communicate the results of statistical analysis including writing professional reports;
- Become more comfortable with quantitative techniques and data science.

Statistical Knowledge Learning Objectives:

- Summarize data using numerical and graphical approaches;
- Test hypotheses given various probability assumptions using appropriate statistical software;
- Perform regression analysis under various assumptions for the regressand and regressors;
- Validate model assumptions and correct for common problems in regression analysis
- Interpret causal effects and use regression for prediction;
- Differentiate between different regression models and choose the most appropriate tool for the task at hand.

Course Structure: We will meet on Monday each week from 10:40 – 11:30. Students are expected to bring their laptops to every class fully charged. Each class builds on the material covered in AEB3550 so you should request the course concept maps for each module if you are

not taking the two classes concurrently. If you miss a class, you are expected to make up the work covered that week in your own time to include in your final portfolio.

Required Course Materials:

- ***Required Text:*** *R Cookbook: Proven Recipes for Data Analysis, Statistics, and Graphics* by J.D. Long and Paul Teetor (2019) https://rc2e.com/
- ***Recommended Text:*** *Data Analysis for Business, Economics, and Policy* by Gábor Békés and Gábor Kézdi. Cambridge University Press, copyright 2021. ISBN: 978-1-108-48301-8 (Hardback) or 978-1-108-71620-8 (paperback). Data analysis business economics and policy | Econometrics, statistics and mathematical economics | Cambridge University Press
- ***E-learning:*** There is an E-Learning Canvas webpage for this course. E-learning can be accessed via http://elearning.ufl.edu using your Gatorlink username and password. If you are having difficulties accessing E-learning, please contact the UF Computing Help Desk by calling (352)-392-HELP or via email helpdesk@ufl.edu.
- ***Microsoft Office 365:*** This class makes use of Microsoft excel for applied data analysis and Microsoft word for written reports. You have access to Microsoft Office 365 as a free download: https://it.ufl.edu/services/gatorcloud-microsoft-office-online
- PositCloud: You will need to join the cloud based RStudio class by clicking on this link *Link TBD* You will login with your uf google account. Once in the class, you should see the class projects already. We will spend the first-class session getting everyone familiar with PositCloud. Note: you are encouraged to download the latest version of RStudio on your own computer for future R work and creative projects although you can use Posit Cloud for free and do not have to worry about having the most up to date version.

Course Assignments and Expectations:

This course emphasizes professional and skill development and as such, the only assignment in this course is a portfolio that you will create, iterate on, and submit in its final form at the end of the semester. By that time, you will have received abundant feedback about the quality of your work, been given time for revision, and curated a portfolio worthy of showing future employers, nerdy friends, and maybe even your parents.

Grades in this course are determined by the breadth and depth of your portfolio. In this way, you can pre-determine your expected output (we will create a contract) and your final grade will be determined based on your ability to adhere to that contract. Throughout the semester, we will have opportunities to:

1. Mine for data from governmental/nongovernmental resources
2. Write code within RStudio that creates tidy data tables ready for analysis
3. Describe data using tabular and graphical approaches
4. Visualize phenomena governed by probability and make comparisons
5. Explore data visualization techniques for discrete random variables
6. Generalize data for a lay audience both graphically and numerically
7. Conduct and interpret hypothesis tests for continuously distributed random variables

8. Visualize relationships among variables using a scatter plot
9. Create and interpret simple and multiple regression models
10. Assess whether model assumptions are met and identify ways to avoid violating model assumptions
11. Make predictions and forecasts based on regression models

Each student will identify a phenomenon of interest for their final portfolio which will, effectively, be a portfolio walking a reader through the data analysis process of discovery for their set of data. There will also be a requirement to set learning goals for yourself in this class (it could be to create at least one bar graph, line graph, and histogram, to transform data with simple code, or to work on carefully documenting your work for replicability, etc). Class time will be spent using both Excel and R to describe, visualize, and interpret data and statistics. The choice of which tool to use is determined by the student and their own SMART goals.

Final Portfolio: Your final portfolio should be completed using R Markdown.

Portfolio Component	**% of Total**
A contract defining SMART goals and collaboratively determined learning outcomes	10%
A sample of a script that could be used in a program (such as R) to clean data, perform a statistical test, or create data visualizations	10%
A prepared tidy dataset that others could pick up and easily perform analysis with	10%
Graphical analysis of a phenomenon of interest	10%
Probability visualization and analysis for discrete random variable(s)	10%
Probability visualization and analysis for continuous random variable(s)	10%
Hypothesis test(s) motivated by research questions	10%
Analysis of simple relationships among two variables using scatter plot(s)	10%
A refined multiple regression analysis with predictions or forecasting	10%
A reflection on achievement of learning objectives	10%
Total	100%

Creating a collaborative learning space focused on growth over content:

Each class will begin with a "stand-up" where in 30 seconds to 1 minute, each student has the opportunity to describe where they are at in their project and gather feedback for improvement and/or progress (for example, a student may have created a graph last class that is now posing an interesting research question—the student may ask for tips or code on how to best go about answering the latest research question). The instructor and students will provide feedback and advice on how to tackle their goals for the day. This is meant to a) keep you on track with your project b) give you feedback so that the work you present in your final portfolio is the highest quality work c) provide an opportunity to improve your own data analysis skills and your ability to receive critical feedback from others. Grades are only ubiquitous in a school setting—in the real world, your work is subject to constant scrutiny, revision, and ultimately, dissemination.

Since we are in a school setting, to better target grades with effort and learning, the following grades can be contracted for and achieved by the end of the semester based on empirical evidence:

A: you continually attended class sessions, often submitted work for critique, critiqued other's work, revised work, and ultimately created a portfolio which is a stunning showcase of your mastery of course topics as evidenced by having all required components and providing the best examples of your work.

B: you usually attended class sessions, sometimes submitted work for critique, critiqued other's work, revised work, and ultimately created a portfolio which is an adequate showcase of your mastery of course topics as evidenced by having all required components and providing the best examples of your work.

C: you sometimes attended class sessions, rarely submitted work for critique, critiqued other's work, revised work, and ultimately created a portfolio which is a showcase of your attempt to master course topics as evidenced by having all required components and providing the best examples of your work.

You may not contract for a grade lower than C. If you do not do the work for this class, you will receive a failing grade (E). Your grade will be determined jointly with the professor during a final conference where you will discuss your portfolio, learning, and anticipate future actions. In general, each portion of the portfolio will be assessed by pass/fail criteria. If you earn a pass for at least 9 out of 10 criteria, you will be awarded an A; if you achieve a passing grade for 8 out of 10 criteria, you will be awarded a B; and so on.

Student Evaluation:

Grade	Percentage of Portfolio with a passing grade	Grade Points
A	90% or more	4.00
B	80% – 89.9%	3.00
C	70% – 79.9%	2.00
D	60% – 69.9%	1.00
E	59.9% or less	0.00

Grades and Grade Points: For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

Academic Honesty: As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*" You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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*." 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).

Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. 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://sccr.dso.ufl.edu/process/student-conduct-code/

Examples of cheating: copying the homework of a peer, copying, and pasting from a source without quotations and source attribution, paying someone else to do your homework/project/exam, dividing work amongst you and your peers and then all submitting the same document, giving or receiving material from peers…

Schedule:

Class Day	Topic	Criteria Goal—Submit and review
8/25/25	Data and Statistics	Contract
9/1/25	Labor Day	No class-Tidy dataset
9/8/25	Descriptive Statistics	Graph(s) and table(s)
9/15/25	Introduction to Probability	**Revision/Catch-up**
9/22/25	Discrete and continuous probability	Histograms and analyses
9/29/25	Sampling distributions and Interval Estimation	Data visualizations
10/6/25	Catchup—midpoint conference	**Revision/Catch-up**
10/13/25	Hypothesis Testing, part 1	Research questions
10/20/25	Hypothesis Testing, part 2	z-test and t-test
10/27/25	Experimental Design and ANOVA	ANOVA
11/3/25	Simple Linear Regression	Scatter plot(s)
11/10/25	Simple Linear Regression, Part 2	**Revision/Catch-up**
11/17/22	Multiple Regression	Multiple regression
11/24/25	Thanksgiving	
12/1/25	Time series, linear probability, etc.	Multiple regression/**Revision**
Finals	Final project due and final conferences	
This schedule is entirely preliminary and activities/dates are subject to change!!		

This course adheres to all UF Academic Policies: https://go.ufl.edu/syllabuspolicies