

FOS 6936/HUN 6936: Topics in Food Science/Topics in Human Nutrition

Applied data analysis in food science and human nutrition

Class #28928/28927

1 Credit Hour

Spring 2023

Location and Time: Thursdays, 11:45 am to 12:35 pm, TUR 2353

Instructor: Diana H. Taft, Ph.D. (pronouns are she/her)

dianataft@ufl.edu

(352)294-3577

Office Hours: Dr. Taft will remain available for students for 1 hour after each class session in her office (if you plan to come to office hours later during the hour, please let Dr. Taft know by the end of class). Dr. Taft is also available for office hours by appointment, please email to schedule a time.

Course Website:

Required Readings: There is no required textbook for this course. Readings are listed on the syllabus and will be posted on the course website

Prerequisites: STA 6166 or instructor permission

Purpose of Course: The purpose of this course is deepen student understanding of how to apply statistics to research questions, and to introduce statistical models relevant to food science and human nutrition research not covered in STA 6166.

Course Goals and Objectives: By the end of this course, students will:

1. Be able to choose between basic statistical models to answer research questions
2. Identify when data are a poor fit for a basic model and know what information to bring to a statistician for advice
3. Know when repeated measure or longitudinal data analysis models are required, and be familiar with at least one such model
4. Be able to define machine learning, and be able to use and understand at least one such algorithm
5. Be able to interpret and explain statistical results to non-experts

Grading Policies:

Assignment	Percentage of Final Grade
Homework: Completion	25%
Homework: Correct	25%
Final Project	50%

Homework: All homework assignments are due by the start of class on the due date. There will be one homework assignment assigned each week and due the following week, except for the week the final project is due. Homework grades will have two components, completion and correct. Completion points will be

obtained by attempting to answer every question on a homework assignment, regardless of the correctness of the answer. Correct points will be obtained for correctly answering the questions. Because some weeks are busier than others, students may opt to not complete 1 homework assignment during the semester, and instead turn in a note stating that this will be the skipped homework, for no grade penalty. A one week extension will be granted on homework assignments if a student informs Dr. Taft that he/she/they are ill as long as Dr. Taft is notified as soon as possible of the illness, and prior to the deadline to turn in the assignment – so if you email at 11 am Thursday saying you are sick, you can have the extension. But if you email at 12 pm (after the deadline), you can't have the extension. One week extensions on homework assignments for other important reasons (i.e. religious holidays, major family events) provided Dr. Taft is notified 1 week before the due date of the need for an extension. Late homework will not be accepted without prior granting of an extension.

Final Project: Start working on this early. Dr. Taft is happy to discuss your plans for the project and to provide feedback and assistance, up to one week before the deadline. No extensions will be granted for the final project.

Class Attendance: Dr. Taft does not take attendance. If you need to skip class, as long as your homework is in on time, there is no problem. There is an ongoing COVID pandemic and unusually high levels of influenza and RSV circulating in the community, and some students may be immunocompromised or have small children or vulnerable roommates/family at home. If you are sick DO NOT COME TO CLASS. Dr. Taft is more than happy to review class material with you when you feel better, or to send a zoom link so you do not miss out on the material covered in class. If you skip class every week, do not expect me to spend time catching you up every week, but for the occasional illness/major life event I am happy to be flexible about making sure you get caught up.

Masks: Dr. Taft cannot require you to mask. However, she will provide masks at every class session and offer every student without a mask one every class session as long as the number of COVID cases in the community remains higher than 5 incident cases per 100,000 persons per day (from a 7 day average) in Alachua county. Please remember that other students' health and living situations may be more vulnerable than your own and act accordingly.

Schedule

Date	Topic	Required Readings and Homework
January 12, 2023	Class Introduction	Reading: How to get help in R (https://www.r-project.org/help.html) Introduction to R homework assigned
January 19, 2023	Why probability matters and Bayes theorem	Reading: Dicing with Death Chapter 1 (on course reserve at Marston) Introduction to R homework due Probability homework assigned
January 26, 2023	Behold the Power (Sample Size Calculations Part 1)	Reading: Statistic review 4: Sample size calculations by Elise Whitely and Jonathan Ball (on Canvas) Probability homework due Sample size homework 1 assigned
February 2, 2023	Behold the Power (Sample Size Calculations Part 2)	Reading: pwr package vignette (vignette) Sample size homework 1 due

		Sample size homework 2 assigned
February 9, 2023	What is ANOVA?	Reading: https://www.scribbr.com/statistics/anova-in-r/ Sample size homework 2 due ANOVA homework assigned
February 16, 2023	What is independence anyway?	Reading: fixed vs random independence assumption ANOVA homework due Independence homework assigned
February 23, 2023	Checking your assumptions part 1	Reading: ANOVA assumptions Independence homework due Assumptions part 1 homework assigned
March 2, 2023	Checking your assumptions part 2	Reading: linear model assumptions Assumptions part 1 homework due Assumptions part 2 homework assigned
March 9, 2023	What are linear mixed effect models?	Reading: Part 1 Part 2 (remember, fixed and random effects have variable meaning. Here the author is using fixed for variables that are constant in a subject and random for variables that can vary within a subject) Assumptions part 2 homework due LME homework assigned
March 16, 2023	No Class Spring Break	Enjoy Your Break!
March 23, 2023	What is AI?	Reading: https://doi.org/10.1002/hbe2.117 AI and Food Science AI and nutrition LME homework due AI homework assigned
March 30, 2023	Classification and regression trees	Reading: Background on CART LME homework due CART part 1 homework assigned
April 6, 2023	CART part 2	Reading: CART in R CART part 1 homework due CART part 2 homework assigned
April 13, 2023	Random forest	Reading: Random Forest CART part 2 homework due NO HOMEWORK THIS WEEK – work on your project
April 20, 2023	Sharing Your Projects	Final Projects Due