

Applied Data Analysis

Winter 2020

WHO SHOULD TAKE THIS COURSE?

This course is designed for students who are interested in developing skills for working with data and using statistical tools to analyze them. No prior experience with data or statistics is required. Please note: readings and assignments will be due during winter break, prior to arriving on campus for Winter Session.

WHAT ELSE SHOULD YOU KNOW?

The approach is “statistics in the service of questions”. As such, the research question that you choose (from data sets made available to you) is of paramount importance to your learning experience. It must interest you enough that you will be willing to spend many hours reading about it, thinking about it and analyzing data having to do with it.

The course will offer an intensive hands-on experience in the research process. You will develop skills in 1) generating testable hypotheses; 2) conducting a literature review; 3) understanding large data sets; 4) formatting and managing data; 5) conducting descriptive and inferential statistical tests; and 6) reporting and interpreting results.

Schedule

All assignments, videos, and readings should be completed **prior** to the class session stated. The during class work will not be due until the following class period. Please note: there are assignments during winter break, prior to arriving on campus for Winter Session.

Before class begins:

1. [Course Introduction](#)
2. [Codebooks and Data Architecture](#)
3. [Setting up your computer](#)
4. **Submission Due before first class meeting:** Project Component A, Mini-Assignment 1

Tuesday (1/7/20)

1. [Literature Review and Writing about Empirical Research](#)
2. [Working with Data](#)
3. **During Class Work:** Project Components B/C/D, and Mini-Assignment 2

Wednesday (1/8/20)

1. [Data Management](#)
2. **During Class Work:** Project Component E and Mini-Assignment 3

Thursday (1/9/20)

1. [Graphing Variables](#)

2. [Graphing Relationships](#)
3. [Hypothesis Testing](#)
4. **During Class Work:** Project Component F and Mini-Assignment 4

Friday (1/10/20)

1. [ANOVA](#)
2. [Chi-square and Correlation](#)
3. **During Class Work:** Mini-Assignment 5, Mini-Assignment 6

Monday (1/13/20)

1. Exam 1
2. Continuation of work
3. **During Class Work:** Project Component G&H

Tuesday (1/14/20)

1. [Regression and Study Design](#)
2. [Confounding and Multivariate Models](#)
3. **During Class Work:** Mini-Assignment 7 and 8

Wednesday (1/15/20)

1. [Logistic Regression](#)
2. [Making Posters](#)
3. **During Class Work:** Mini-Assignment 9 and Project Component J and begin Final Poster

Thursday (1/16/20)

1. Continuation of Work
2. **During Class Work:** Final Poster
3. **Submission Due by 7pm:** Final Poster

Friday (1/17/20)

1. Prepare for Oral Presentation
2. Begin final exam practice

Monday (1/20/20)

1. Practice Exams (to be worked on during class)
2. Final Presentations

Final Exam due Wednesday 1/22 by noon.

Class Sessions: Class sessions include instructor, peer mentor and guest support aimed at helping you to make consistent and meaningful progress on your research project and mini-assignments.

Lessons: Rather than a traditional textbook, this course provides a series of “lessons” aimed at preparing students conceptually and technically for the various steps taken in completing their research project. Lessons are presented in video with corresponding text and content/demonstrations. **All assigned lessons should be completed prior to each class session.**

Component Assignments: Students will submit project components through moodle. The purpose is to encourage you to reflect on the research process. So please feel free to ask questions, reflect, or extend beyond what is asked of you. **To receive credit, these component assignments are due at the start of the class session following our work on the topic).**

Research Poster/Oral Presentation: Assignments will build to the completion of an individual project that will be presented at the end of class as a research poster and oral presentation. The poster session will be scheduled on the last day of class for the course. A 5-minute oral presentation followed by a question and answer session is required of each student. All posters must be submitted for printing by 7:00 pm on Thursday, January 16th. This deadline is crucial for the production schedule.

Exams: Two exams will be given in the course and will include questions in objective format (i.e. multiple choice). The first exam will be taken during class and you will be asked to apply your knowledge and integrate material from lessons and class experiences. This exam is “closed-book”; however, you are permitted to bring ONE standard 8.5 x 11” sheet of paper including anything that you think will help you in the exam. A take-home final exam will be give out at the end of the day on Friday January 17th.

Teaching Assistant:

TBD

Commitment to the Course: Students are expected to make marked progress each day and to come to class sessions prepared with questions and planned next steps. It is important to note that to really learn the material and skills presented in this course, students will need to devote a substantial amount of time.

Scientific Integrity: The rules of science should be carefully upheld in everything that you do. The following behavior is absolutely unacceptable: Data fabrication, selective reporting, omission, suppression or distortion. Please be mindful that there is no such thing as a “little scientific misdemeanor”.

Grades: Course grades will be based on

1. Component assignments (25%)
2. Research Poster/Oral presentation (25%)
3. In-class exam (20%)
4. Take home final exam (20%)
5. Positive, helpful, and curious attitude (we should be made better by you) (10%)

Passing Letter Grades/Percentages: A 95-100%; A- 91-94%; B+ 88-90%; B 85-87%; B- 81-84%; C+ 78-80%; C 75-77%; C- 71-74%; D+ 68-70%; D 65-67%; D- 60-64%