

## Course Information

Course Number: ECON 470  
Course Title: Data Science for Economic and Social Issues

## Instructor Details

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## Course Description

Economic and quantitative methods used to evaluate decisions made by individuals, firms, governments and other policymakers; implementation of these methods and how these methods overcome problems that often plague correlational analyses; conduction of retrospective analyses of choices, creation of and implementation of policies so that their effects can be measured, and prediction of the effects of potential policies on social issues like crime, poverty, etc. based on evidence.

## Course Prerequisites

Grade of C or better in ECMT 463 or approval of instructor. No prior coding experience is required.

## Course Learning Outcomes

By the end of the course, successful students will be able to:

- Identify appropriate datasets and process them using base and *tidyverse* functions in R.
- Produce thoughtful descriptive statistics to summarize and interpret the content of data.
- Implement causal analysis techniques to address issues such as selection bias.
- Convey empirical design and findings through reports that include graphs and tables.

## Required Course Materials

- Wheelan, Charles. *Naked statistics: Stripping the dread from the data*. WW Norton & Company, 2013.
- Access to a computer.
- Additional readings will be posted to Canvas or will be available for free online.

## Grading Policy

### *Assessments*

Assignment	Percentage
In-Class Quizzes	20%
Homeworks	20%
Exam 1	15%
Exam 2	15%
Project	30%

### **In-Class Quizzes**

In most classes, there will be a short quiz. Some will be graded for completion, others for correctness. I will drop the two lowest quiz scores at the end of the semester.

### **Homeworks**

There are four homeworks (see the calendar below for due dates). The homeworks are divided into two parts.

- The first part includes questions to strengthen your understanding of class material and to practice using R. You must work on your own computer for this first part, although you can discuss it with other students. If you discussed with anyone else, include their names. Even if you discuss with others, make sure you are turning in *your own work*. If you thoughtfully used ChatGPT, StackExchange, or other online resources, you must also write those down. There are no point deductions for discussing with other students or using resources. *For the sake of academic honesty and integrity, I ask you to disclose it.*
- The second part includes steps that you must complete (with your partner or group if applicable) for the project. These steps will help you get your final project ready throughout the semester.

### **Exams**

Exam 1 is in-person using pen and paper. Exam 2 is a take-home exam. Both are individual without consulting other students. I will provide more information closer to the exams.

### **Project**

You will work to complete a written report of an empirical analysis that you will implement. Each homework includes guidance on how to make progress on the report. You may work with 0-2 people on

the project, but you must remain in the same group throughout the semester. You may work with students across sections. See the description of the project for more details.

## Attendance

I do my best to design class time to be useful and engaging. Students who want to maximize success and learning should plan to attend class, even if attendance does not directly count toward the final grade.

## Grading Scale

I do not make exceptions to the below score ranges.

Letter Grade	Score Range
A	90-100
B	80-89
C	70-79
D	60-69
F	59 and below

## Late Work Policy

- There are no make-ups for missed quizzes due to unexcused absences.
- Homeworks are accepted up to 48 hours after the due date, no questions asked, at 50% penalty.
- No late work is accepted for the exams or the final group project.
- For excused absences, contact Professor Ziff as soon as possible for further details. Work submitted by a student as makeup work for an excused absence is not considered late work and is exempt from the late work policy ([Student Rule 7](#)).

## Topics Covered

- R Basics and R Markdown
- Code Structure
- Loading and Saving Data
- Data Management
- Summary Statistics
- Data Visualization
- Merging and Reshaping Data
- Central Limit Theorem
- Inference
- Regression
- Program Evaluation
- Instrumental Variables
- Discontinuity Designs
- Fixed Effects and Difference-in-Differences
- Event Studies
- Geographic Data and Mapping
- Machine Learning Basics