ECON 346: Applied Economic Statistics Using R
College of Arts & Sciences Syllabus

COURSE INFORMATION   TR 5:40-6:55pm   Fall 2023
Credit Hours: 3   BBH 242

Course Description: This course provides an introduction to the open-source statistical software R, including operations, packages, and coding principles. Students will apply statistical concepts using economic data, gaining experience with the software while deepening their knowledge of economics.

Course Prerequisites: ECON 220, MATH 305, MNGT 368, or equivalent; ECON 215 or 217.

FACULTY INFORMATION

Instructor: Scott Hegerty
Office Location: BBH 340C
Office Hours: TR 5-5:30pm and by appointment (in-person or virtual)
Phone Extension: 5695
E-mail: S-Hegerty@neiu.edu

COURSE MATERIALS

List of Required Texts / Materials: **Provided at https://github.com/hegerty/ECON346**

W. N. Venables and D. M. Smith, *An Introduction to R* (online resource)
G. Grolemund and H. Wickam, *R for Data Science* (online resource)
B. Illowski and S. Dean, *OpenStax Introductory Statistics* (online resource)
S.W. Hegerty, Economics 346 Lecture Notes (.pdf)

COURSE OBJECTIVES / STUDENT LEARNING OUTCOMES

- Acquiring an understanding of R, a popular statistical software that is increasingly being used in business and desired by employers
- Gaining experience in using R software to execute various functions
- Learning the unique syntax of R in a way that can be applied to projects outside of class
- Acquisition and manipulation of economic data in the fields of international, health, monetary, and/or urban economics
- Applying statistical methods using real economic data
- Integrating software and economic/statistical knowledge by producing high-quality written reports.

STUDENT TASKS / ASSIGNMENTS / REQUIREMENTS

Assignments:

Data projects: There will be weekly or biweekly Homework assignments over the semester. They will ask students to apply the concepts learned in class, as well as practice applying

statistical concepts and formulas. These assignments will be labor-intensive, so students must be willing to devote as much time as necessary to completing them. R has high fixed costs to learn, but once you get better at it, it definitely pays off.

Projects will involve data manipulation, graphing, and written interpretations of results. The final project will be more intensive and expect students to incorporate all aspects of the class. Writing and professional presentation are just as important to a successful assignment as the data analysis itself.

This class expects ALL students to work with R for projects. Resist the temptation to use other software to save time. Students must also upload their code to D2L as part of each assignment.

Two short **Exams** will assess students' understanding of the tools used in the course and "big picture" thinking.

Missed Exams will not be made up. With an appropriate excuse, the remaining course components will be adjusted to equal 100 percent. Students must be prepared to provide such documentation as a Grandmother's obituary or doctor's excuse.

Grading Policies and Formulae:

Your grade will be assigned based on the following formula:
Attendance and participation	10%
Data projects (best 5 x 10% + 20% for final project)	70%
Midterm Exam	10%
Final Exam	10%

Each assignment and test will be given a specific number of points. Your final score will be based on the number of points you earn overall, weighted by the scale given above. Grades will then be assigned by the following scale:

100-90.00	A	89.99-75.00	B	74.99-60.00	C	59.99-50.00	D
Below 50	F						

Course Outline:

A detailed list of lecture topics and tentative dates is given at the end of this syllabus.

1) Introduction to the course
2) Summary Statistics
3) Data Visualization
4) Statistical Distributions
5) Hypothesis Testing
6) Misc. topics/Regression Analysis
7) Time Series Analysis

MIDTERM: October 10 or October 12 (first 30 minutes of class)
FINAL: Last 30 minutes of last class (Nov. 30)

COURSE POLICIES AND STATEMENTS

Absence Policy:

Attendance is strongly recommended. Per NEIU attendance policy, less than 75% attendance will automatically result in failure for the semester, regardless of your grade on assignments and exams.

Missed Exams will not be made up. With an appropriate excuse, the remaining course components will be adjusted to equal 100 percent. Students must be prepared to provide such documentation as a Grandmother's obituary or doctor's excuse. "I need more time to study" and "I have other classes" are not appropriate excuses, so don't ask.

Cell Phones and Texting are not allowed at any time. Students are encouraged to turn off their phones before class to avoid any potential embarrassment.
The use of a cell phone or texting in class will result in the immediate deduction of three points from your final grade for each occurrence.

Laptops Laptops may be needed if an appropriate computer lab is not available. Students are expected to remain active and engaged in class at all times. Students who cannot answer questions while using a laptop will not be allowed to continue using one.

Ethics Unless explicitly allowed by the instructor, all homework must be completed individually. This includes all code writing. We will discuss the differences between "appropriate" and "inappropriate" uses in class. Students must be prepared to provide proof of independent work if asked, and will fail the course if they are unable to do so. IF YOU GET CAUGHT "COPYING" CODE INAPPROPRIATELY, YOU WILL GET AN AUTOMATIC ZERO FOR THE COURSE.

Academic Integrity Policy:

REQUIRED: By enrolling in this course, you are bound by the NEIU Student Code of Conduct: http://www.neiu.edu/university-life/student-rights-and-responsibilities/student-code-conduct. You will be informed by your instructor of any additional policy specific to your course regarding plagiarism, class disruptions, etc.

ADA Statement:

Northeastern Illinois University (NEIU) complies with the Americans with Disabilities Act (ADA) in making reasonable accommodations for qualified students with disabilities. To request accommodations, students with special needs should make arrangements with the Student Disability Services (SDS) office, located on the main campus in room D104. Contact SDS via (773) 442-4595 or http://www.neiu.edu/university-life/student-disability-services.

Campus Safety:

REQUIRED: Web links to Campus Safety: Emergency Procedures and Safety Information can be found on NEIUport on the MyNEIU tab or as follows: http://homepages.neiu.edu/~neiutemp/Emergency_Procedures/MainCampus/.

ECON 346		Fall 2023			
Week	Topic	Dates	Lec/Lab	Topic	Assignment
1	Intro	22-Aug	*Lec*	*Intro*	
		24-Aug	Lab	Calculate with R	
2		29-Aug	*Lec*	*Data Sources, course plan*	
		31-Aug	Lab	Make growth rates	
3	Summary Stats	5-Sep	*Lec*	*Mean, SD*	HW1
		7-Sep	Lab	Min, Max, Median	
4		12-Sep	*Lec*	*Correlation*	HW2
		14-Sep	Lab	Inflation correlations; Spearman w/outlier	
5	Data Visualization	19-Sep	*Lec*	*Principles (design, font, conveying info); commands*	
		21-Sep	Lab	Correlation scatterplot	
6		26-Sep	*Lec*	*More principles: Lines, etc.*	HW3
		28-Sep	Lab	Histogram, ts.plot()	
7	Distributions	3-Oct	*Lec*	*Compendium*	
		5-Oct	Lab	Find critical values, etc. in R	
8	Hypothesis Testing	10-Oct	*Lec*	*Intuition*	
		12-Oct	Lab	t-test/F-test	HW4
9		17-Oct	*OL*	*Various tests: Reading/Review*	
		19-Oct	OL		
10	Misc. topics/Regression	24-Oct	*Lec*	*Understanding regression*	
		26-Oct	Lab	Set up a regression	HW5
11		31-Oct	*Lec*	*Loops, packages, etc.*	
		2-Nov	Lab	Print an item in a loop	
12	Time Series	7-Nov	*Lec*	*Basic concepts*	
		9-Nov	Lab	Make a ts()	
13		14-Nov	*Lec*	*Differences, seasonality, etc.*	HW6
		16-Nov	Lab	Difference a series/plot and analyze	
14	Project	21-Nov	Lab	Work day (final project)	
15	Project	28-Nov	Lab	Work day (final project)	
		30-Nov	FINAL	Final project due	Project