# INTRODUCTION TO R STATISTICAL ANALYSIS SOFTWARE

SYLLABUS

Summer 2023(August 14, 2023 - August 18, 2023)


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| **Instructor:** | Lifeng Ren | **Time:** | 1PM-4PM, Central Time |
| **Email:** | ren00154@umn.edu | **Place:** | Ruttan 135B and Zoom |
| **Office Hours:** | After class: 4PM-5PM; Ruttan 135B& Zoom | | |


## Course Description

This course is a preliminary introduction to the R statistical software, specifically tailored for new graduate students. All the lecture materials will be provided on the Github Repository (Here:To be Published Later), and on Canvas.

- Rather than encompassing every aspect of R, the course aims to provide a strong groundwork for Econometric Analysis (APEC8211- 8212).
- Programming for Econometrics (APEC8221), and Big Data Methods in Economics (APEC8222) are the classes you might want to register if you want to learn more about coding in R and Python.
- The teaching goal of this class is to provide everyone with solid R-programming foundation for the first-year PhD Econometrics Class. After this class, you should be able to:
  - Code in IDE (R-studio) with both R-scripts, and R-markdown.
  - Understand the data types and how to save and acess to the data in R.
  - Obtain basic data cleaning and manupulations skills in R.
  - Write simple functions with loops in R.
  - Run regressions in R.
  - Visulize basic graphs in R.

## Before Class

- Download and Install R and R studio on your desktop from this website
- Get your UCard access to Ruttan:
  - Get a U card so you can access the building.
  - Request advanced access to the building (Ruttan Hall): Ruttan Hall Access Request Form.
  - If you have questions, reach out to Melissa Isle (webe0342@umn.edu)
- Finish the Survey.
- Bring your laptop to the class.

## Reference

There are many excellent references out there. Here are some textbooks or online available notes I suggest you guys read or at least have a PDF version in hand for reference.

- R for Data Science (Personally recommended)
- Solutions for the book: R for Data Science

- Introduction to Econometrics with R
- R for Economics
- Data Visualization with R: by Rob Kabacoff
- Matloff, Norman. The art of R programming: A tour of statistical software design. No Starch Press, 2011.
  - This is the one that Programming for Econometrics Class will be using and mostly used for previous R Review Class.
  - PDF version available through UMN Library or you can find it online

## Syntax Cheat Sheet

- Data Wrangling with dplyr and tidyr
- Basic
- data.table
- dplyr

## Exercise

To learning coding better, we all need practice more. So, we will have several exercises both in-class and after-class. They are **optional** and are only designed to help you improve your level of understanding.

- I will provide a typed answer key to all exercise I assigned with R Markdown (.rmd) code. You are free to use my code as a template for yourself.
- My teaching goal is to make sure everyone can finish the in-class exercises. If possible, we will spend couple minitues every class to go over the after-class exercise as a review first.

## Class Style

We will code together and I will expalain the code while we are coding them. We will have a 5 mintues break every hour.

## Tentative Class Schedule

| Date: | Tasks |
|---|---|
| Before Class: | Install the R, R studio and required libabry |
| 8/14/2023 | Workflow; Other necessary coding/study tools for PhD studies. Introduction to R: dataframe and R-studio interface. |
| 8/15/2023 | Data Manupulation and Data Cleaning: tidyverse, data.table |
| 8/16/2023 | Functions, loops, and Simulations. |
| 8/17/2022 | Econometrics with R:aer |
| 8/18/2022 | Data Visulization: ggplot2 |