Stat 479/590: **Statistical Computing**

Instructor: Yan Lu, `yanlu@unm.edu`

Prerequisites:

Stat 345: Elements of Mathematical Statistics and Probability Theory

Stat 427/527: Advanced data analysis I.

Class Time/Place: 2:00 pm - 3:15 pm TR Mitchell Hall 206

Office hours:

Tuesday 5:00pm - 6:00pm by zoom

`https://unm.zoom.us/j/98922126517`

Meeting ID: 989 2212 6517

Passcode: 123

Thursday 11:00pm-12:00pm by zoom or in person SMLC 316

`https://unm.zoom.us/j/99749280590`

Meeting ID: 997 4928 0590

Passcode: 123

Class website: `https://canvasinfo.unm.edu`

Objective: Computational data analysis is an essential part of modern statistics. Competent statisticians must not just be able to run existing programs, but to understand the principles on which they work. They must also be able to read, modify, and write code, so that they can assemble the computational tools needed to solve their data analysis problems, rather than distorting problems to fit tools provided by others. This class gives an introduction to statistically-oriented programming using R and presents frequently used methods related to optimization, integration, simulation, and smoothing.

Topics: Brief introduction to LaTeX, reproducible (knitr) reports, data structures, indexing, iteration, functions, simulation and optimization methods etc. Particular emphasis will be given to the development of algorithms for solving a variety of statistical problems using resampling and simulation techniques, such as the EM algorithm, bootstrap, integration, Monte Carlo methods and density smoothing.

Computing: The course might involve the intensive use of software package R and Rstudio.

R:

`http://cran.r-project.org`

Rstudio:

`https://www.rstudio.com/products/rstudio/download`

To see how to install R and Rstudio in windows, visit

`https://www.youtube.com/watch?v=eD07NznguA4`

for Mac

`https://www.youtube.com/watch?v=GFImMj1lMRI`

Latex:

`https://ctan.org/starter`

Reference Books:

Computational Statistics, Geof H. Givens and Jennifer A. Hoeting 2005

Monte Carlo Statistical Methods, C. P. Robert and G. Casella 2004

Lecture notes for past statistical computing, Erik Erhardt Fall 2015

Grading: Attendance, 10%; Homework, 90% (bi-weekly homework).

Grading for graduate students and undergraduates will be separate.

	Stat 590	Stat 479
A	90%-100%	80%-100%
B	75%-89%	65%-79%
C	65%-74%	55%-64%
D	under 65%	under 55%