Statistics: Linear Model

Spring 2019

Professor:	Gunwoong Park	**Time:**	TBA
Email:	gwpark23@uos.ac.kr	**Place:**	TBA
Office:	TBA	**Office hours:**	TBA

Course Pages: TBA

Text Book:

- Primary: Faraway, Julian. *Linear Model with R*, 2nd ed: Chapman & Hall, 2014.
- Supplementary: Faraway, Julian. *Extending the Linear Models with R*, Chapman & Hall, 2006.

Objectives: The ultimate goal is to develop the skills needed by a statistical data analysis. Emphasized topics mainly include data analysis, problem solving, and report writing. In specific, the class focuses on *Linear Regression Models*: definition, fitting, Gauss-Markov theorem, inference, interpretation of results, meaning of regression coefficients, diagnostics, influential observations, collinearity, lack of fit, robust procedures, transformations, variable selection, ridge regression, PCA, and LASSO. The objective is to learn what methods are available and, more importantly when they should not be applied.

Prerequisites: This course is primarily designed for graduate students. An undergraduate-level understanding of probability, statistics, algorithms, and **linear/matrix algebra** is assumed. If you do not meet the prerequisites, you should not be in the class.

Computing: The software we will be using for this course if **R**, which can be downloaded for free from www.r-project.org. R is freely available software that runs on both UNIX and Windows. No previous experience with R is required, though there may need to be some investment of time in the early part of the course for utilizing R. For additional backfound on R, see Appendix A in the textbook. In addition, Rstudio is recommended for homeworks and final exam).

Lectures: Lecture notes will be posted on the course web page.

Homework:

- None

Exams: There will be a total fo 2 exams - two midterms and final exams are closed book. The paper will be graded as report. Cell phones must be turned off and out of sight for all exams. Any student found with a cell phone during an exam will receive a zero on that assignment. If you cannot do an exam time for legitimate reasons, you need to contact the instructor at least 2 weeks in advance to discuss and make arrangements for an alternative exam time. Note that the location for the final exam will be posted in the course web page.

Grades: Grades will be assigned according to performance in the following categories:

Homework & Attitude	20 %	Midterm I & II	40 %	Final	40%

Important Dates:

Midterm ..... April 15
Final Exam ..... June 17

Course outline:

This outline may change.

Week #1	Ch 1: Introduction to R
Week #2	Ch 2: Estimation
Week #3	Ch 3: Inference
Week #4	Ch 4: Prediction
Week #5	Ch 6: Diagnostics
Week #6	Ch 7: Problems with Predictors
Week #7	Midterm
Week #8	Ch 8: Problems with Error
Week #9	Ch 9: Transformation
Week #10	Ch 10: Variable Selection
Week #11	Ch 11: Shrinkage Methods
Week #12	Logistic Regression
Week #13	Generalized Linear Model
Week #14	Generalized Linear Model
Week #15	Final Exam