Syllabus

Course and Contact Information:

> Course: Regression Analysis, STAT 2118, 12
>
> Semester: Fall, 2021
>
> Meeting time: TR, from 3:45PM to 5:00PM
>
> Location: Rome 205

Instructor:

> Name: Hua Liang
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> Campus Address: Rome Hall, Room 754
>
> Phone: 202-994-7844
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> Office hours: TR 5:30pm-6:30pm or by appointment
>
> Lab time:

Course Description

The goal of the course is to introduce basic concepts of simple and multiple linear regression, inference, partial correlation, residual analysis, stepwise model building, multicollinearity and diagnostic methods, indicator variables, and their applications. Some examples with detailed analyses in R will be illustrated.

Prerequisite

One course in statistics such as STAT 1051, STAT 1053 or equivalent is required. Students are also assumed to be familiar with integral and differential calculus, basic algebra for instance extraction of roots of equations of the second and third degree, and accurate manipulation of algebraic expressions.

Goals of Course

- Understand basic concepts of correlation, regression, model diagnostics and model building and variable selection;
- Know how to fit and interpret regression models and apply them in various fields (e.g. Biology, Biomedical Science, Economics, Engineering, Finance, Social Science);
- Analyze and interpret regression data using R;
- Compare different regression models and select the most appropriate one among them;
- Develop strong data analysis skills;
- Synthesize and present knowledge gained through course examples and projects.

Course Structure

The class consists of two 1-hour lectures and 1-hour lab per week. The grade is based on homework, one midterm and the final exam/final project/presentation.

Textbook:

1. Applied Linear Regression (4th Edition) by Sanford Weisberg (required)
2. An R Companion to Applied Regression (3rd Edition) by John Fox and Sanford Weisberg (recommended)
3. Applied Linear Regression Models (5th edition) by Michael Kutner, Christopher Nachtsheim, John Neter, and William Li (recommended)
4. Regression Analysis by Example (5th Edition) by Chatterjee and Hadi (recommended)

Exams

There will be one midterm examination and one final examination/final project/presentation. These will contribute the majority of your final grade. The final examination/final project/presentation covers the entire course with an emphasis on the latter part of the course. The examinations will have both mathematical and conceptual (written) components.

Home Work

Homework will be given on a biweekly basis. Regularly homework is due every other Wed, or otherwise the date announced. Some will be of a theoretical basis, and some will be real data analysis. Data analysis should be used R, or Splus, or Matlab, or SAS. If you miss the class, you can ask/copy the assignment.

Final Grade

Your final grade will depend on the following components with these proportions: homework (30%), midterm (30%), final exam/project/presentation (40%). The percentage grades needed to achieve an A, B, C, or D will follow approximately the following scale: $90 - 100 = A$, $80 - 89 = B, 70 - 79 = C, 55 - 69 = D, 0 - 54 = F$.

University policies:

University policy on observance of religious holidays

In accordance with University policy, students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance. For details and policy, see: https://compliance.gwu.edu/religious-accommodation.

Academic Integrity

Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information. For details and complete code, see:
https://studentconduct.gwu.edu/code-academic-integrity.

Safety and security

In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.