

# STAT 6860: Foundations of the Linear Model

Spring 2018

**Instructor: Xinyi Xu**

Office: 440G Cockins Hall

Email: [xu.214@osu.edu](mailto:xu.214@osu.edu)

Office Hours: Wednesday 3-4pm, or by appointment

**Grader: Chenggong Han**

Office: 328 Cockins Hall

Email: [han.1071@osu.edu](mailto:han.1071@osu.edu)

Office hours: Thursday 10-11am

**Lecture Hours:** MWF 12:40-2:30pm, Cockins Hall 218

**Prerequisites:** Enrollment in the PhD program in Statistics or Biostatistics, or permission of the instructor

**Course Description:**

STAT 6860 is designed to get you ready for the second year course on the linear models. While you have all seen linear algebra in undergraduate coursework, the typical course is taught with the goal of mathematics in mind. In Statistics, different parts of linear algebra are more important, and we will spend time on some of these areas. Particular examples include the emphasis in Statistics on covariance matrices (square, symmetric, non-negative definite), projections and successive projections as they relate to least squares fits of a model, and the ordering of matrices that is useful for optimal design. During the course, we will review basic concepts of linear algebra and we will build connections to formal statistical models and methods – in particular to the multivariate normal distribution and to the linear model, as well as to least squares and related techniques.

**Text:** *Matrix Algebra from a Statistician's Perspective*, by D. A. Harville, Springer.

This text is an excellent, but it was not written with a course in mind. Instead, it has been written as a reference book and it contains a wealth of useful results. This text was chosen for the course because it is one you can read with only a standard undergraduate course on linear algebra as background and because it is a great book to have on your bookshelf.

**Website:** <https://carmen.osu.edu>

Important announcement and homework assignments will be posted here.

**Grading:**

Homework	30%
Midterm	30%
Comprehensive final	40%

**Homework:** Homework will be collected approximately weekly, making for 6 homework assignments. You can work together and discuss problems, but make sure that the write-up is your own. Solutions to many of the homework problems are readily available, but finding solutions online or in printed form and copying them would constitute cheating. Please write your homework neatly, so that the TA can easily read it. A subset of problems from each assignment will be graded. Turning homework up to one day late will lead to 10% deduction from the assignment points, and no homework will be accepted more than one day late or after the solutions are available.

**Exams:** There will be one midterm and one comprehensive final exam.

- The midterm will be in class, closed-book and closed-notes, covering the materials from Chapters 1-8 and Chapters 10-12, as well as the materials from the lectures. It will be approximately one hour, during the second half of the class on **February 8**.
- The comprehensive final exam will also be closed-book and closed-notes, with more weight on post-midterm materials. It will be on **April 26, 2:00-3:45pm**.
- You have until one week after receiving your grades on the exams to dispute the grade; the same applies to any homework grade. Note that when asking for a question to be re-graded, the entire assignment/exam may be re-graded, and so you run the risk of losing more points than you gain back.

**Academic Misconduct:** It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

**Special Accommodations:** Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614-292-3307, [slds@osu.edu](mailto:slds@osu.edu); [slds.osu.edu](http://slds.osu.edu).