

Syllabus – Math672 – Spring 2020

Statistical Methods, Part II

Instructor: Dr. Hailin Sang Office hours: TuTH 2:30-3:45 or by appoint.
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Class time: TTh 1:00-2:15 pm Place: Hume Hall 331
Textbook: *Applied Linear Statistical Models* by Kutner, Nachtsheim, Neter, and Li, 5th edition, McGraw-Hill, 2004 (required; also used for Math 672 in Spring 2020)

Goal:

Linear statistical models for regression, analysis of variance, and experimental design are widely used today in business administration, economics, engineering and the social, health and biological sciences. Successful applications of these models require a sound understanding of both the underlying theory and the practical problems that are encountered in using the models in real-life situations. This course follows Math671, covering the second parts of the textbook: ANOVA models and experimental design. The goal is to seek blending theory and applications effectively, avoiding the extremes of presenting theory in isolation and of giving elements of applications without the needed understanding of the theoretical foundations. Through out the semesters, students will practice data analysis and implementation of the introduced methods and will gain experience of solving practical statistical problems involving real data sets.

Course outline:

1. One way, two way ANOVA models and higher order treatment structures.
2. Estimation of variance components. Multiple comparisons. Testing contrasts.
3. Experimental design: balanced designs, nested designs, repeated measure designs, Latin squares and similar designs.
4. Random effects, randomized block designs.
5. Split-plot designs, split-split-plot designs.

Grading:

Quizzes **20%**, Projects **25%**, Midterm exam **25%**, Final exam **30%**
>90%=A, 87%-90%=A⁻, 83%-87%=B⁺, 80%-83%=B, 75%-80%=B⁻,
70%-75%=C⁺, 65%-70%=C, 60%-65%=C⁻, <60%=D

Important:

1. Exams and Quizzes are open book, notes.
2. Projects are assigned about every 3 weeks. Recently acquired statistical methods will be used to analyze various data sets. Projects should be done in R, SAS or Matlab. A report containing the code, only essential parts of the output, your comments, results and answers should be submitted for grading.