IE 342: Design and Analysis of Experiments
Fall 2024

Class Information

Time: TR 1:00pm – 2:15pm
Classroom: Room 1120, E2-2

Instructor Information

Name: Hoseung Song
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Office Hours: R 2:30pm–3:00pm

TA Information

TBA

Course Description

The course objective is to learn how to plan, design and conduct experiments efficiently and effectively, and analyze the resulting data to obtain objective conclusions. Both experimental design and statistical analysis issues are discussed. Opportunities to use the principles taught in the course arise in all phases of engineering and scientific work, including new product design and development, manufacturing and service process improvement, and technology development. Applications from various fields of engineering will be illustrated throughout the course. Relevant coding examples will provide students with the opportunity to gain hands-on experience on experimental design and data analysis. Computer software packages (R) to implement the presented methods will be illustrated, and you will have opportunities to use it for homework assignments and the lab reports.

Assignments and lecture notes will be uploaded to the KLMS page.

Topics

- Simple comparative experiments.
- Factorial design.
- Randomized block design.
- Full factorial design.
- Fractional factorial design.
- Robust design.
- Split-Plot designs and ANCOVA.

Prerequisites

Students should have a basic working knowledge of statistical methods.

Textbook

There is no required textbook for this course, but a lot of materials are based off textbooks "Design and Analysis of Experiments" by D.C. Montgomery, "Design of Experiment" by Sung Hyun Park, "Applied Linear Statistical Models" by Kutner et al., "Experiments: Planning, Analysis, and Optimization" by C. F. Jeff Wu, and lecture notes from Professor Art B. Owen at Stanford University.

Grading

The course grade is determined by the following components:

Attendance	5 %
Homework	25%
Lab report	10%
Midterm exam	30%
Final exam	30%

- Late homeworks and reports will receive 0 credit and no make-up assignments will be granted.
- Attendance will be checked on a sporadic basis.
- Lab report is a coding homework and $\mathcal{R}$ will be used.

Anything in this syllabus is subject to change at the discretion of the instructor.