Introduction to Design and Analysis of Economics Experiments

Professor Daniel Houser, dhouser@gmu.edu, 3-4856.
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Required text: Box, Hunter and Hunter. (1978) Statistics for Experimenters. Wiley.
Recommended reference: Cox, D. R. (1958) Planning of Experiments. Wiley.
<u>Course Information</u>

Overview: This class provides an introduction to the design and analysis of economics experiments. The topics covered will be useful to anybody interested in running scientific experiments, but will be primarily geared toward behavioral experiments as conducted by economists and psychologists.

Grades: Grades are based on class participation, in-class presentations, performance on exams and home assignments. This course is open to both graduate and undergraduate students. Graduate students (but not undergrads) are required to write a paper for this course.

Office Hours: Professor Houser will hold office hours after class on Thursdays in Fairfax, or by appointment.

Topics:

1. Science, Experiments and Statistics

2. Comparing two treatments

> a. Probability distributions, parameters, statistics'

> b. Reference sets and distributions

> c. Normal, t, chi-square and F distributions

3. Random sampling and the declaration of independence

> a. Statistical dependence and independence.

> b. Sufficiency

4. Randomization and blocking with paired comparisons

> a. Boys' shoes example

> b. Blocking and randomization

> c. Noise and models

> d. Blocking in comparative experiments

5. Significance tests and confidence intervals

> a. Inferences about differences in means and variances

> b. Inferences about proportions: The binomial distribution

c. Inferences about Frequencies: The Poisson distribution

d. Contingency tables and tests of association

6. Comparing k treatment means

a. Amount of variation due to within and between treatments

b. ANOVA

c. Multiple comparisons

7. Randomized blocks and two-way factorial designs

a. Model and ANOVA for randomized block designs

b. Model and ANOVA for factorial designs

8. Designs with more than one blocking variable

a. Latin squares

b. Greaco and hyper-graeco latin squares

c. Balanced incomplete block designs

9. Modeling

a. The problem of experimental design

b. Comprehensive versus sequential approach to experimental investigations

10. Factorial designs with blocking

11. Fractional factorial designs with blocking

12. Modeling and regression analysis

a. Fixed, random and mixed effect models

13. Response surface methods

14. Dependence, time series and repeated measures.

Students with disabilities: Students with Faculty Contact Sheets for this class need to present them to the instructor as soon as possible. Other students requiring reasonable accommodations, as covered under the Americans with Disabilities Act, should contact the Disability Resource Denter (DRC) to open up a DRC file and discuss needed accommodations. Questions and requests for reasonable accommodations should be directed to DRC, 234 SUB I, phone (703) 993.2474 or email dwyne@gmu.edu.

Honor code: George Mason University is an honor code university. Students pledge not to cheat, lie, plagiarize or steal in academic matters.