

GEORGE MASON UNIVERSITY

## **Econ 445: Design and Analysis of Experiments**

SUMMER 2023

**Campus:** Online, May 23 - July 30

**Instructor:**

**Daniel Houser**

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**Co-Instructor:**

Shan Gui

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by appointment

### **Course Description**

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

### **Two Synchronous Zoom Sessions**

Welcome meeting in week 1 and Q&A for final exam in week 10. Refer to Blackboard - Synchronous sessions for details.

### **Textbooks**

**Required:**

Box, Hunter and Hunter. (2nd Edition) Statistics for Experimenters. Wiley.

**Recommended:**

1. Cox, D. R. (1958) Planning of Experiments. Wiley.
2. Sidney Siegel and N. John Castellan Jr. (2nd edition) Nonparametric Statistics for the Behavioral Science.

## Grades

Expect to work 15-20 hours per week on assignments for this course. Unless otherwise stated, all assignments are due at 11:55 pm, EST **Sundays** (see specific due day on Blackboard - Assignments).

### Homework (40%)

Five (5) Problem Sets and Five (5) Reading Assignments will be handed out.

You need to submit your works **on Blackboard** before the due date. Refer to the course schedule and weekly overviews for details.

### Midterm-Presentation (30%)

You need to present one paper from the reading articles in the syllabus. Each presentation lasts for 10-12 minutes. You need to prepare a 8-12 pages slides for the presentation.

You need to register for your presentation [in this shared form](#). Please choose a different paper from your classmates.

You need to submit your video **on Blackboard** before the due date. Refer to the course schedule and weekly overviews for details.

### Final Exam (30%)

The final exam will be on **Thu. Jul 28 – Sat. Jul 30**.

When you start the exam, you need to submit your works **on Blackboard within 3 hours**. Group discussion is not allowed. Late submissions will not be accepted. No make-up exams will be offered. Exams missed for unexcused reasons will receive a score of 0.

## Outlines

Notes are available at Houser Website: <http://mason.gmu.edu/~dhouser/courses.htm>

1. **Science and Experiments**

*Box, Hunter & Hunter, Chapter 1; Cox, Chapter 1; Houser website, Lecture 1*

2. **Review of Basic Statistics**

Probability distributions, parameters, statistics

*Box, Hunter & Hunter, Chapter 2; Houser website, Lecture 2*

### 3. Comparing Two Entities

- a. Relevant reference sets and distributions
- b. Randomized Paired Comparison Design
- c. Blocking and Randomization

*Box, Hunter & Hunter, Chapter 3; Houser website, Lecture 3*

### 4. Comparing k treatment means

- a. Completely Randomized Design - One-way ANOVA
- b. Randomized Block Design - Two-way ANOVA

*Box, Hunter & Hunter, Chapter 4; Houser website, Lecture 4*

### 5. Designs with more than one blocking variable

- a. Latin squares
- b. Greco and hyper-greco latin squares
- c. Balanced incomplete block designs

*Houser website, Lecture 5*

## Reading Articles

1. Smith, V. L. ,1962, "An experimental study of competitive market behavior", Journal of political economy, 70(2), 111-137.
2. Rassenti, S. J., Smith, V. L.,& Bulfin, R. L., 1982, "A combinatorial auction mechanism for airport time slot allocation", The Bell Journal of Economics, 402-417.
3. Plott, C. R., & Smith, V. L., 1978, "An experimental examination of two exchange institutions". The Review of economic studies, 45(1), 133-153.
4. Rassenti, S. J., Smith, V. L., & Wilson, B. J., 2003, "Controlling market power and price spikes in electricity networks: Demand-side bidding", Proceedings of the National Academy of Sciences, 100(5), 2998-3003.
5. Kosfeld, Michael, Heinrichs, Markus, Zak, Paul J., Fischbacher Urs, and Fehr, Ernst, 2005, "Oxytocin increases trust in humans", Nature, Vol. 435
6. Brosnan, Sarah F. and Waal, Frans B.M. de, 2003, "Monkeys Reject Unequal Pay", Nature, Vol. 425
7. Cox, James C., 2004, "How to Identify Trust and Reciprocity", Games and Economic Behavior, 46:2, 260-281
8. Houser, Daniel and Robert Kurzban, 2002, "Revisiting Kindness and Confusion in Public Goods Experiments", American Economics Review, 92:4, 1062-1069
9. List, John A. and David Lucking-Reiley, 2002, "The Effects of Seed Money and

- Refunds on Charitable Giving: Experimental Evidence from a University Capital Campaign". *Journal of Political Economy*, 110:1, 215-233
10. Fehr, Ernst and Bettina Rockenbach, 2003, "Detrimental effects of sanctions on human altruism", *Nature*, Vol. 422
  11. Schotter, Andrew, 2003, "Decision Making with Naive Advice", *American Economics Review*, Vol. 93, No. 2, 196-201
  12. Cox, James and Oaxaca, Ronald, 1999, "Can Supply and Demand Parameters be Recovered from Data Generated by Market Institutions?" , *Journal of Business and Economic Statistics*, 17
  13. Charness, Gary and Martin Dufwenberg, 2006, "Promises and Partnership", *Econometrica*, 74: 6, 1579-1601
  14. Chen, Yan and Sherry Xin Li, 2009, "Group Identity and Social Preferences", *American Economic Review*, 99:1, 431-457
  15. Gneezy, Uri, 2005, "Deception: The Role of Consequences", *American Economic Review*, 95: 1, 384-394
  16. Cox, James C. and Oaxaca, Ronald L. 1989, "Laboratory Experiments with a Finite-Horizon Job-Search Model", *Journal of Risk and Uncertainty*, 2:301-330
  17. Duffy, John and Ochs, Jack, 1999 "Emergence of Money as a Medium of Exchange: An Experimental Study", *American Economic Review* 89, 847-877.
  18. Venon, Smith, Suchanek, Gerry and Williams, Arlington, 1988 "Bubbles, Crashes, and Endogenous Expectation in Experimental Spot Asset Markets", *Econometrica*, 56:5, 1119-1151
  19. Gneezy, Uri and List, John A, 2006, "Putting Behavioral Economics to Work: Testing for Gift Exchange in Labor Markets Using Field Experiments", *Econometrica*, 74:5, 1365- 1384
  20. Chen, Yan and Tayfun Sonmez, 2006, "School Choice: An Experimental Study", *Journal of Economic Theory* 127:1, 202-231

## **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 Center (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](mailto: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.