

UNITED STATES NAVAL ACADEMY
Spring 2011 SA475E Section 0201
Quantitative Economics Seminar: The Experimental Economics Seminar

Mathematics Professor:

Professor: Professor Charles Mylander
Office: Chauvenet
Office hours: MW 0900-1400
E-mail: wcm@usna.edu, or at home mylander@atlanticbb.net

Economics Professor:

Professor: Associate Professor Kurtis Swope
Office: Nimitz
Office hours: MW periods 5, 6 (or by appointment)
E-mail: swope@usna.edu

Link to Course Site: www.usna.edu/Users/econ/pschmitt/SA475E/SA475.html

Please **READ AND RETAIN** this policy statement.

SA475E is the capstone course for the Quantitative Economics major. In this seminar students are given the opportunity to work on independent research under the close supervision of both the Economics and Mathematics Department Faculty. The course instructors of this section have chosen experimental economics and game theory to be the topics of your seminar.

The focus of the course is your conducting and analyzing an economic experiment, or using a game theoretic model to analyze a multiperson decision situation. Your research will be documented in a paper and presented in a project briefing towards the end of the course. The project paper and briefing are the most important part of the course.

In the first six weeks the course instructors will take about 70% of the class time presenting material on the seminar topics, teaching you about experimental economics and game theory. There will be several sessions devoted to using the computer system *z-tree* in conducting experiments. About 30% of the class time will be devoted to having the students reporting on their progress in developing their project proposals. They will present ideas found in the literature, and describe topics/problems they think may provide a subject for the project portion of the course. Some time will be returned to the students to work on developing their project proposals.

During the remainder of the course you will be working on your research project. One of the seminar leaders will be assigned as your project advisor. You **must confer with your project advisor at least once a week** and on a less frequent basis you will be directed to meet with the other seminar leader on your project.

1. The Course Research Project

In this seminar the students must choose to conduct their research in one of two overlapping areas: game theory or experimental economics.

Game theory is broadly interpreted as the study of multiperson decision problems. The disciplines most involved in game theory are economics, mathematics, and military science. Students working on a

project using game theory will use concepts and skills acquired in other mathematics and economics courses to formulate a game model and estimate the pure strategy payoffs for several scenarios. For 2-person game models optimal min-max solutions must be found. Examples of areas using matrix games in analysis include ways to efficiently govern common pool resources; ways to efficiently provide public goods; oligopoly pricing decisions; coordination games; tactics in sports, and anti-submarine tactics.

Experimental economics involves the design of experiments using human subjects to support, to develop or refute the predictive powers of models and theories of economic behavior. Experiments have also been used to compare the behavior of economic decisions makers (subjects in an experiment) to a game theoretic solution (i.e. the Nash Equilibrium). For example, game theory indicates that the Nash Equilibrium solution to the voluntary contribution public goods game is for a player to “free-ride”, thereby not contributing to the public good. Experimental economics allows economists to determine if this equilibrium is consistent with human behavior. Finally, economic experiments have also been designed to test the assumptions of consumer and producer behavior in economic models. Students working in this area will choose an economic model or game model and design an experiment using midshipmen playing the roles of the economic agents. The results of the experiment will be statistically analyzed, and the results (or hypotheses) compared with those predicted by the theoretic model. In many cases the economic experiment will be a variation of an experiment reported in the literature.

2. **The Course Research Paper**

The major focus of this seminar is your research paper. During the first four to six weeks you are to search for a topic for your research paper. You will do a literature search and perhaps a web search for papers using game theory or reporting on economic experiments. Reports of your literature search are required.

Research papers focused on two-person games or military applications of game theory should either analyze some variation of a game analysis presented in a journal article or research report, or expand or create an example of the game model that is presented in a paper. In either case the payoff matrix for an example of the game must be determined and its mathematical solution must be found.

Research papers must include: (1) a review of at least three articles related to the area being investigated, (2) a presentation of the procedures used and the research hypotheses, and (3) an analysis of the results of your investigation and how your results fit with those reported in the literature.

Students will be assigned to one of the instructors as Project Advisor. The other faculty member will be a Reader. When working on the project the student must be in close contact with his or her primary advisor. This includes mandatory, weekly office visits to discuss progress on the project

3. **Paper Format**

The paper will start with title page, which will include your name, the date, the course and an abstract, which will be about half-a-page in length and single-spaced. The body of the paper will be divided into sections and double-spaced. The body should include: (1) an introduction, (2) a literature review with at least three pertinent articles from quality journals, approved research reports or books, (3) a description of the game (either experimentally or theoretically), (4) the analysis, (5) the results, and (6) the conclusions. Papers should include figures and tables as appropriate. These figures and tables should be discussed in the paper **and** be able to “stand on their own,” which implies a descriptive title is necessary.

Results from computer packages should not merely be stapled to the back, but should be professionally redone as a figure or table to support your results. *Z-tree* code should be documented in an appendix of

the paper (you should also email the program to both instructors as the print method is not yet user-friendly, merely a text document). Your paper's target audience is your classmates and future quantitative economic majors. The data used in most cases will be put into an appendix; the paper may have several appendices.

There will be a section at the end of your paper listing references. Published material will be referenced following the style used in the *American Economic Review* or *The Chicago Manual of Style*. Reference to material to be found on the web should follow the following format:

Author (if known): title or short description, hyperlink address, organization sponsoring the material, the date it was last updated (if given) and the date you located it. For example:

Roth, Alvin E. "Al Roth's game theory and experimental economics page,"

<http://www.economics.harvard.edu/~aroth/alroth.html>, Dept of Economics, Harvard University, last updated 11/16/10, located on 12/1/10.

All pages, except the title page, must be numbered and have a header; this policy statement provides an example of the desired style.

4. **The Formal Presentation**

Twenty minutes will be allotted for each presentation; except when answering questions, the blackboard will not be used; a computer presentation is required. Students are strongly encouraged to make several "dry runs" of their presentation. Each presentation will be assigned a reviewer. Following the presentation the reviewer will ask the first question about the paper-presentation and provide a written review of the paper designed to help the author improve it. A copy of the paper must be given to the reviewer at least 24 hours before the presentation.

5. **Milestones**

- Draft Project proposal (can be delivered by email) – **7 February**.
- Final Project proposal – **16 February**.
- Experiments have been run – **7 March**.
- Completion of statistical analysis of experimental results – **23 March**.
- 1st draft of paper, which must include an abstract, an introduction, a literature review, and experimental design (if an experimental economics project is chosen) and an outline of unfinished parts of the paper – **28 March**
- Complete draft of project report due **18 April**.
- Project presentations – **22 April to 2 May**.
- Final submission of project report **2 May**.

Failure to meet one or more deadlines will lower your final grade.

6. **Grading**

Interim grades (6 and 12 week) are based on seminar participation, short papers (reviews of the literature), and progress reports. Although the homework assignments and short papers will be graded, the grade received on these will affect the final grade only in borderline grades. The final course grade is driven primarily by the grade of the research paper and quality of the formal, oral presentation of your research.

VIII. Schedule**WEEK ONE:**

- TU 1/11 **Administrative day and introduction to the course**
Participate in some quick games.
Reading: “Experimental Market Economics”, Vernon Smith and Arlington Williams, *Scientific American*, December 1992
- We 1/12 **Participate** in a land-assembly game (sequential game) played using *z-tree*
Discuss: “Experimental Market Economics”, Vernon Smith and Arlington Williams, *Scientific American*, December 1992
Reading: (1) Look at Prof. Alvin Roth’s web page cited above.
Reading: (2) “Contracts, Behavior, and the Land-Assembly Problem: An Experimental Study” Ryan Wielgus, Pamela Schmitt, Kurtis Swope, and John Cadigan
- Fr 1/14 **Z-tree tutorial - basics**
Discuss: The results from Wednesday’s experiment and “Contracts, Behavior, and the Land-Assembly Problem: An Experimental Study” Ryan Wielgus, Pamela Schmitt, Kurtis Swope, and John Cadigan.
Reading: “The Economics of Fair Play,” Sigmund, K., Fehr, E., and Howak, M. *Scientific American*, January 2002

WEEK TWO:

- We 1/19 **Z-tree tutorial**
Participate: in a z-tree public good game (simultaneous game)
Show how z-tree works and study the z-tree code used in the game.
Reading: Sections 1 and 2 in “z-tree Tutorial”, Urs Fischbacher’s technical report (an electronic version of the entire Tutorial is linked to the course web site).
Discuss: “The Economics of Fair Play,” Sigmund, K., Fehr, E., and Howak, M. *Scientific American*, January 2002.
- Fr 1/21 **Z-tree tutorial**
Code: Each student will change the parameters for a public good game and test the changes. (**in class**).
Assignment: Read abstracts of previous papers done in this course and email to Prof. Mylander your 1st, 2nd, and 3rd choices for the one you will review..
Reading: “The Competitive Advantage of Sanctioning Institutions,” Gurerk, O, B Irlenbush, B. Rockenback. *Science* 312 (7 April), pp 108-111, (2006).

WEEK THREE:

- Mo 1/ 24 **More on z-tree** The differences in programming a simultaneous versus a sequential game in *z-tree* by first playing an ultimatum game using *z-tree* and then comparing the code in the public good game to the ultimatum game code.
Discuss: “The Competitive Advantage of Sanctioning Institutions,” Gurerk, O, B Irlenbush, B. Rockenback. *Science* 312 (7 April), pp 108-111, (2006).
Assignment: Changes the parameters for the ultimatum game to 4 subjects playing for 3 rounds. Test the changes on the computer in your room and printout the spreadsheet output.
Reading: "Collective Action and the Evolution of Social Norms," Ostrom, E. *The Journal of Economic Perspective* Vol. 14 #3, (Summer 2000), pp 137-158.
- We 1/26 **Participate:** Nastiness experiment – experiments by hand and another z-tree game.
Discuss: "Collective Action and the Evolution of Social Norms," Ostrom, E. *The Journal of Economic Perspective* Vol. 14 #3, (Summer 2000), pp 137-158.

- Fr 1/28 **Reading:** “The Moral Costs of Nastiness” Klaus Abbink and Benedikt Herrmann
Discuss: The Moral Costs of Nastiness” Klaus Abbink and Benedikt Herrmann
Reading: A paper done in the course in a previous year.
Assignment: Write a review of the paper you read; a handout will be provided listing the points that a minimum must be covered in the review.

WEEK FOUR:

- Mo 1/31 **Risk Aversion**
Participate in a “risk” experiment.
Reading: “Are Risk Preferences Stable?,” Anderson, Lisa R. and Mellor, J. M., College of William and Mary, Dept. of Econ., Working Paper #74, August 2008.
Assignment: Write a review of the Anderson-Mellor paper following the guidelines given.
- We 2/2 **Group Brain Storming Session – Course Project Ideas**
Auctions and the U. of Virginia Game Site
Participate in an “auction” experiment
Discuss: (1) Results from the “risk” experiment
(2) : “Are Risk Preferences Stable?,” Anderson, Lisa R. and Mellor, J. M., College of William and Mary, Dept. of Econ., Working Paper #74, August 2008.
- Fr 2/4 **Group Brain Storming Session – Course Project Ideas**
Your draft project proposal is due 7-February.

WEEK FIVE:

- Mo 2/7 No class meeting. Students work on developing ideas for their own project and search the literature. **By 1600 send an email to both instructors** proposing an area you want to develop for your course project. Your proposal must be longer than 200 words and reference at least one article in the literature.
- We 2/9 Meeting of groups of students working in similar areas. You will be notified by email of your group assignment and its meeting time.
- Fr 2/11 Meeting of groups of students working in similar areas. You will be notified by email of your group assignment and its meeting time.

WEEK SIX:

- Mo 2/14 Be prepared to present your project proposal orally (about a 5-minute presentation). The instructors will provide guideline on writing a research proposal, planning your project and a style guide for you paper. We will also discuss your Final Project proposal **due 16-February**. Handout the “Formal Project Proposal: Guidelines”
- We 2/16 **Turn in your written proposal.** This report will contain an outline of the issues to be studied, and the approach planned. Bring two copies. Finish the rest of the oral presentations of project proposals.

WEEK NINE:

- Mo 3/7 Send by email to both instructors a report on the status of your experiment or game model. Include a brief description of the experiment, the number of subjects that participated, the incentives used, etc.

WEEK TEN:

- Mo 3/21 A lecture on what is expected in the abstract and the introduction of your project report and a style guide for your report.

WEEK ELEVEN:

Mo 3/28 **Email to your advisor before noon** the 1st Draft of project report in an MSWord file.
(Send a copy only to your project advisor.)

WEEK FOURTEEN:

Mo 4/18 **Turn in** the complete, printed draft of project report to both instructors.

Fr 4/22 Oral presentations of project reports.

WEEK FIFTEEN:

Mo 4/25 Oral presentations of project reports.

We 4/27 Oral presentations of project reports

Fr 4/29 Oral presentations of project reports

WEEK SIXTEEN:

Mo 5/2 Oral presentations of project reports and project papers due.

Turn in two copies of your project report to your project advisor and one copy to the other instructor. **Also send a copy of the title page with the abstract on it to Prof. Mylander.**