NEUROECONOMICS

PSYC 080.02 Winter 2015	TuTh, 10:00-11:50am, X-hour W 3:00-3:50 Class Location: Moore 302
Office Hours: Th 12:00-1:00pm (or by appointment) Moore 356	Alireza.Soltani@dartmouth.edu

COURSE DESCRIPTION AND OBJECTIVES

Neuroeconomics is a new emerging field in which a combination of methods from neuroscience, psychology, and economics is used to better understand how we make decisions. In this seminar course, we learn about economic and psychological theories that are used to investigate and interpret neural activity and processes which underlie decision making. We also examine how recent neurobiological discoveries are used to refine decision theories and models developed in psychology and economics. During this course, not only will students read and discuss the most current research findings in neuroeconomics, but also learn to develop new ideas/hypotheses and design experiments to test those ideas.

The overall objective of this course is to:
1) learn in depth about different topics in neuroeconomics
2) learn about different methods used in neuroeconomics
3) develop your ability to identify interesting research questions and to design experiments to address those questions

Being able to communicate what you have learned is valuable regardless of what you want to do with your life. Many interactive aspects of this course should improve both your learning and your communication skills.

During the first week I will provide an overall background and introduction for the course. Thereafter, in each class we will have two 20-minute student presentations on the assigned readings and will spend the rest of the time on discussing those readings and raised questions.

TEXTBOOK (OPTIONAL)

Neuroeconomics: Decision Making and the Brain (2nd Edition)
Edited by: Paul W. Glimcher and Ernst Fehr
Published by Academic Press (2103), Print Book ISBN :9780124160088

READING MATERIAL

There will be assigned readings throughout the term which supplement some of the chapters in the textbook. All reading assignments (including assigned chapters from the textbook) will be available on *Canvas,* and are due the day of the class they are assigned to.

COURSE REQUIREMENTS

Prerequisites

Instructor permission.

Grading

A = 93-100, A- = 90-92.9, B+ = 87-89.9; B = 83-86.9, B- = 80-82.9, etc.
Note: Median grade in this course is B+.

Grade Breakdown
1) Attendance and Participation (including in-class assignments) (8%)
2) Brief notes on the readings (14%)
3) Discussion points (14%)
4) Conceptual exams (20%)
5) Paper presentations (10%)
6) Final project presentation (8%)
7) Final project paper (26%)

1) Attendance and participation (including in-class assignments) (8%)
This is a seminar course which requires students' participation. Not only do I expect you to attend all classes, but also I ask for lively participation from all students in the class. To better engage you, in some classes we will have short in-class assignments. Feedback you provide to your peers after their presentations will also contribute to your participation mark.
I will allow you **two non-consecutive,** excused absences during the semester for sickness, family emergencies, job interviews, conferences, or just relaxing in the mountains. **Use your excused absence wisely**. Any additional absences will only be excused if you have a doctor's note stating you have a health crisis. **Keep the X-hour open. Sessions maybe added or moved to the X-hour as needed.**

2) Brief notes on the readings (14%)
For each class you will write a brief (maximum 1.5 page, 12 pt font, single spaced) note on some of the readings assignments for that class. This note should be your personal critical, take-home message from all the readings, including the background/context for a given study, the objective of the study, main findings, and a conclusion/perspective. Your goal should be to demonstrate that you have read and understood the assigned readings. **These notes cannot be the copy of the assigned papers' abstract, etc.** These notes should be submitted on *Canvas* by 11pm the night before the class. At the beginning of the term, I will give you detailed feedback on your notes so you can improve them.

3) Discussion points (14%)
One of the best way to learn is to ask good questions. For most classes, we will read a book chapter or a few papers. You are required to generate at least one discussion question/issue for each reading (or the topic) and post it on *Canvas* by 11pm the night before the class. For each reading, you can focus on one issue that you find interesting or on a caveat that could undermine the conclusions. You should post a unique question on the discussion board and if you are late in posting and somebody else has already posted the question you came up with, you have to generate a new question/discussion point. A few rules you should follow. (1) Your question/concern needs to be stated very clearly. (2) Raising a point about statistical significance is not valid unless you elaborate on what the lack of significance could mean for the whole conclusion. (3) Raising an issue about individual differences (or why they excluded certain subjects) is not valid unless you elaborate on what it could mean for the whole conclusion. (4) Raising an issue about contradiction with other studies needs to be accompanied by the implications of such contradiction. (5) Asking "what else" we have learned since then is not a valid discussion point.

4**) Conceptual exams (20%)**
To enhance your learning and assess your synthesis and creative thinking skills, we will have two conceptual exams during the term (see important dates). This exams start with short questions

about important concepts/keywords you have learned about, and continue with working in small groups to create a concept map of the relationship between a "stimulus" concept and other concepts you have learned prior to the exam. You will be given all these keywords as we learn them and before each exam. Immediately after each exam, we will discuss the concept map produced by each group. You are encouraged to work in a team to achieve the goal, in this case, a clear concept map of what you have learned.

5**) Paper presentations (10%)**
Each paper presentation will be based on one of the two assigned papers for each class (see course schedule for topic of the week). Each presentation should last about 20 minutes and cover the research question addressed, background literature, experimental logic, method, results, and implications. When reviewing the background literature, you will sometimes need to present figures from the key papers that set the stage for the current paper. I will do a presentation during the first week to give you a model, but feel free to improvise. I encourage you to keep your introduction and discussion fairly simple; boil it down to an issue or two. Make sure that you explain the methods and results (especially the figures) clearly. You will have one single and one group (with another classmate) presentation during the term.

6,7) Final project presentation and paper (34%)
During the course of the term, you will learn about different topics in neuroeconomics and become familiar with the literature pertaining to these topics. Meanwhile, you should identify an outstanding research question and design an experiment that addresses this question. I want you to be creative but also realistic in your design. If you know enough about electrophysiology, fMRI, genetics, or other techniques to involve them in your design, go for it.
During the final weeks of class, you will give a presentation discussing your project that will last approximately 20 minutes (depending upon how many students enroll in the course). You will present your project in the same way that you'd present a completed paper except that you will not have data to present or conclusions to draw. Although you will not present data, you will probably find it useful to present figures with possible results so you can discuss the implications of different results.
Your final paper should consist of an introduction, methods, and a hypothetical results section. It will NOT include a discussion section because you will not have results to discuss. In your results section, you should discuss potential and possible outcomes and mention their implications. You'll probably find it useful to present figures with possible results. Although you will not create the experiments you propose, write your method section with the same amount of detail usually included in a typical journal article (not an abbreviated method section like papers in Science or Nature). If your experiments involve human neuroimaging, you don't need to specify the nitty-gritty of the scanning protocol and the data analysis (scanner details; TR; flip angle; etc), but you should be as precise as possible.
To prepare you for your project and paper, we will have a "paper prospectus" exercise around mid February. For this exercise, I will provide you with a sample worksheet where you answer questions that help you get a clear plan about your final paper. Based on your answers I will provide general feedback and suggestions to the whole class. If you want individual feedback, I would be happy to meet with you during office hours.
Please submit your final paper on *Canvas* by 11pm on Mar 16 as a Word or PDF file using 1.5 line spacing, 12 pt font, and 1 inch margins. It should be 10 pages of text maximum, not including figures, tables, and references. Use APA style for citations and references. Insert your figures and tables into the text, but insert them after you're done writing so you can check the paper's length. Your grade will be based on the clarity of your paper, your design/logic, and your creativity. Because

Creativity will be central to your final project so I would advise that you immerse yourself in the literature while trying to identify a research question and an experimental approach.

Final note about grade
If you are inclined to challenge a grade, know that your paper will be reassessed in its entirety and your revised grade can rise or fall compared to the original grade.

IMPORTANT DATES

Tuesday Feb 3: Conceptual exam I
Thursday Feb 26: Conceptual exam II
Tuesday Mar 10: Last day of class
Monday Mar 16: Final paper due

CLASSROOM POLICIES

Honor Code
Students in PSYC 80 are expected to strictly adhere to the Dartmouth Academic Honor Principle. As described in the Student Handbook, fundamental to the principle of independent learning is the requirement of honesty and integrity in the performance of academic assignments, both in the classroom and outside. Dartmouth operates on the principle of academic honor. Students who submit work that is not their own or who commit other acts of academic dishonesty will forfeit the opportunity to continue at Dartmouth. If you have questions or concerns regarding this policy during the course, please contact Professor Soltani.

Missed Exam or Assignment
A student will only be excused from mid-term exams or an assignment by permission of the Instructor and on the basis of a written note from a dean, doctor, or supervisor of official college-sponsored events being held off-campus and requiring a students' absence. If excused, a make-up must be taken as soon as possible (usually within 1 day of the originally-scheduled exam/assignment date).

Late Assignments
All papers and presentations are due at the date and time specified. Late papers, without an official documented College excuse (health or family emergency), will not be accepted with the exception of the final paper. No extensions will be granted due to computer failure, roommate difficulties, etc. Scores of late final papers will be reduced by 10% for every 24-hour period a paper is late. According to College policy, there are no excused absences from class for participation in College-sponsored extracurricular activities.

Technology, etc
(1) Laptops and ipads **may not** be used in class, unless otherwise instructed for specific in-class assignments. I prefer and encourage you to take notes by hand, especially during lecture segments. Studies show that students learn more from taking notes by hand than if they type them. If you must use your laptop for taking notes, see me.
(2) Please shut your cell phone, iPhone, blackberry, or whatever other ringing, vibrating, singing gadget you carry with you or in your bag.
(3) **Eating or drinking** is not allowed in the class.

Email Policy
Do not email me regarding any assignment within 24 hours of the time it is due. This is so that you will start working on your assignments in advance of the due date – no help if you start too late.

Disabilities
Any student with a documented disability needing academic adjustments or accommodations is requested to speak with me **by the end of the second week of the term**. All discussions will remain confidential, although the Academic Skills Center may be consulted to verify the documentation of the disability.

Religious Observances
Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance which conflicts with your participation in the course, please meet with me **by the end of the second week of the term** to discuss appropriate accommodations.

Final note about syllabus
Course readings and schedule are subject to change

COURSE SCHEDULE

Readings with (*****) will be presented by students. You should sign up for the two papers you would like to present as soon as possible.

WEEK 1:

Jan 6 (Tu): Introduction to neuroeconomics, syllabus, etc.
Readings: Introduction chapter; Glimcher & Rustichini 2004

Jan 8 (Th): Methods from neuroscience + example presentation
Readings: Chapters 5,6; Salzman et al 1990

WEEK 2:

Jan 13 (Tu): Methods from psychology and economics
Readings: Chapters 1,3; Chen et al 2006*, Hayden et al 2010*

Jan 15 (Th): Neurophysiology of choice
Readings: Glimcher 2003; Platt & Glimcher 1999*; Rorie et al 2010*

WEEK 3:

Jan 20 (Tu): Foraging behavior and uncertain world
Readings: Hayden et al 2011*; Kolling et al 2012*

Jan 22 (Th): Neural representation of economic value
Readings: Padoa-Schioppa & Assad 2006*; Padoa-Schioppa & Assad 2008*

WEEK 4:

Jan 27 (Tu): Studying choice via manipulation
Readings: Gold & Shadlen 2000*; Amemori & Graybiel 2012*

Jan 29 (Th): Confidence in choice
Readings: Kiani & Shadlen 2009*; De Martino et al 2013a*

WEEK 5:

Feb 3 (Tu): Conceptual exam I

Feb 5 (Th): Decision under risk and prospect theory
Readings: Kahneman & Tversky 1979*; Tversky & Kahneman 1992*; Trepel et al 2005

WEEK 6:

Feb 10 (Tu): Reference-dependent choice: framing and endowment effects
Readings: De Martino et al 2006*; De Martino et al 2009*

Feb 12 (Th): Intertemporal choice and addiction
Readings: Bickel et al 1999*; Kable & Glimcher 2007*; Bickel et al 2007; Chapter 10

WEEK 7:

Feb 17 (Tu): Game theory: competition and strategy
Readings: Barraclough et al 2004*; Donahue et al 2013*; Chapter 26

Feb 19 (Th): Trust and cooperation
Readings: Fehr & Gacher 2002; Rand et al 2009*; King-Casas et al 2005*

WEEK 8:

Feb 24 (Tu): Neuroeconomics of the market
Readings: Lohrenz et al 2007*; De Martino et al 2013b*

Feb 25 (W): Presentations of proposed experiments (X-hour)
Readings: NA

Feb 26 (Th): Conceptual exam II

WEEK 9:

Mar 3 (Tu): Presentations of proposed experiments
Readings: NA

Mar 4 (W): Presentations of proposed experiments (X-hour)
Readings: NA

Mar 5 (Th): Presentations of proposed experiments
Readings: NA

WEEK 10:

Mar 10 (Tu): Pharmacology of choice; conclusion and final discussion
Readings: Pine et al 2009*; Kosfeld et al 2005*; Chapter 14