

PHIL 306 -- Games and Decisions

Spring 2020 Monday / Wednesday 5:30 – 6:45pm Beckman 213

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Office Hours: Wednesdays 4-5pm in the Becket Building
 By appointment Monday and Tuesday afternoons in the Becket Building

1. Overview

GE Area(s): 7QI – Quantitative Inquiry

Prerequisite(s)

Either a philosophy course, an upper division course in math or economics, or instructor's permission.

Description

Decision theory and game theory are formal apparatuses for analyzing preferences and choices. Students will learn the basics of the formal theories and then examine their foundations and philosophical implications. Some attention will also be paid to psychological research into how people actually make decisions, as well as how we make collective decisions, and, where possible, we will make use of group projects, in-class experiments, and other activities that will help to shed light on the course's subject matter. (3 credits)

Course Objectives / Learning Outcomes

1. To acquaint students with the formal apparatus of decision theory, game theory, and social choice theory.
2. To acquaint students with philosophical problems and issues arising from these theories.
3. To introduce students to philosophical methods of argument and analysis.
4. PLO Critical Reasoning: To improve the student's ability to construct and analyze complex arguments, and distinguish good reasoning from bad.
5. PLO Logic: To improve the student's ability to demonstrate knowledge about and skill in deductive or inductive reasoning.
6. PLO Metaphysics & Epistemology: To acquaint students with some of the most important figures and theories in metaphysics and epistemology.
7. Quantitative GE: To apply and analyze quantitative methods and techniques.

2. Course Logistics and Materials

Course Schedule and Topics

Roughly speaking the semester will be broken into three parts. The first part will focus on Decision Theory, the second part on Game Theory, and the third part on Social Choice Theory. Respectively, these are the theories of individual choice, strategic choice, and collective choice. During each part of the course we will discuss the importance of the respective theories and as well as some paradoxes and puzzles that raise some difficulties for them. Topics to be covered include:

- ordinal vs. cardinal utilities
- decisions under risk vs. under uncertainty
- static vs. dynamic problems
- positive vs. zero sum games
- the difficulty of cooperation
- achieving fair outcomes
- different voting rules
- how to make collective decisions
- the psychology of decision making

The course will primarily be based on lectures that will be presented in class (with slides to be posted to blackboard at the end of class). Most lectures will also correspond to chapters in the recommended texts. These overlaps will be indicated on the first slide of each powerpoint. The Course Schedule (posted on Blackboard) will be regularly updated with a list of topics covered and to be covered (as well as the lecture notes associated with them). The Course Schedule also has *tentative* dates for the exams. Please take note of these dates. On some weeks (not all), problem sets will be posted to Blackboard, usually before class starts on Monday. These will not be graded, but you are expected to complete the assignments before Wednesday of that week. The goal of the problem sets is to make sure you understand the material that has been covered so that you will be prepared for exams, and so that I can slow down (or speed up) the pace at which we are covering things as needed.

Finally, note that the recommended texts for the course are designed to supplement our lectures. You will only be tested on material presented in lectures, but you are encouraged to make use of the recommended texts. This is because the texts are often able to go into more detail or provide more examples than we are able to in class. One thing this means is that the texts contain some sophisticated math. Don't let that scare you off. The main use of the texts will be for the nice examples they contain (although if you can work through the math your understanding of things will be that much better)!

Computers

You are permitted to use computers or tablets in class to take notes or read digital texts. However, I ask you to respect your classmates and refrain from surfing the internet, watching videos, or doing other things that might prove distracting to those sitting around you. If at any point the use of computers becomes disruptive to the class or impedes our ability to have good discussion I reserve the right to restrict their use in class.

Recommended Texts

There are no required texts for this course. However, it is strongly recommended that you purchase:

Michael Resnik, *Choices*, ISBN: 0-8166-1440-7

And if you are interested in further resources that may help you in this course:

Gerald Gaus, *On Philosophy, Politics, and Economics (Wadsworth Philosophical Topics)*, ISBN: 9780495008989

William Spaniel, *Game Theory 101: The Complete Textbook*, ISBN: 1-4927-2815-2

There is also an online library of helpful youtube videos associated with this book:

<http://gametheory101.com/courses/game-theory-101/>

Donald Saari, *Chaotic Elections! A Mathematician Looks at Voting*, ISBN: 0-8218-2847-9

3. Assessment

There are six components to your grade. These are distributed as follows:

Class Participation	15%
Modeling Assignment	15%
Midterm 1	5%
Midterm 2	20%
Midterm 3	20%
Final Exam	25%

Grades will be assigned on a numerical scale from 0 – 100, with grades rounded up to the nearest tenth and corresponding to letter grades in the usual way.

94 – 100	A	73 – 76	C
90 – 93	A-	70 – 72	C-
87 – 89	B+	67 – 69	D+
83 – 86	B	63 – 66	D
80 – 82	B-	60 – 62	D-
77 – 79	C+	0 – 59	F

You will have a few opportunities to receive extra credit over the course of the semester, including through consistently excellent participation (explained below) and presenting your modeling exercise to the class. I will announce these opportunities in advance. There will be no additional extra credit opportunities besides those I announce as available to everyone in the class.

(1) *Participation* – You will be graded on the basis of your participation in class discussions. Simply showing up will get you no credit. To make expectations for participation clear and fair we will utilize what I call the "Present and Prepared" system. The system works as follows:

Each day there will be a class roster posted by the door. When you come to class, if you are prepared to participate in class discussion for that day, you can sign the box next to your name. If you do so, you are subject to being called upon in order to help get discussion going, answer a question I have posed for the class, or help us work through a homework problem. If you do not check the roster for that day, I will not call on you. The roster will be available for the first 5 minutes of class. If you forget to sign the roster or show up late to class you will not get credit for the day. Note, however, that whether or not you sign the roster you are always free to ask questions or participate in class discussions.

In order to get the full 15 points available for participation you must sign the Present and Prepared roster at least 15 times (that's about 3/4's of our meetings). In order to get 10 points you must sign the roster at least 10 times (about 1/2 of our meetings), and in order to get 5 points you must sign the roster at least 5 times. No other participation grades are possible and, if (for whatever reason) you fail to sign the roster at least 5 times, then you will get no participation points.

Abuse:

In order to prevent abuse of the system, if you have signed the roster, I call on you, and you are clearly unprepared, you immediately lose 5 participation points. This rarely happens, but if it does I will discuss the issue with you immediately after class. Note that the point of this policy is not to trick you. The questions I will ask will merely require that you have done the reading or homework assignment and are prepared to offer thoughtful answers. Whether you get the answer correct does not matter.

Exceptions:

On rare occasions I will not put out the present and prepared roster. Mostly these will be exam review days, or days when we are beginning a new part of the course. I can't say in advance how many of these days there will be, but there will be ample opportunities for you to sign the present and prepared roster. Plan accordingly! Don't leave things until the end of the semester. Finally, in rare circumstances I may provide up to 5 participation bonus points to individuals whose contributions to class discussions are, in my estimation, particularly valuable to the class. Don't count on getting these points, but know that you may be rewarded for consistently benefiting your fellow classmates by offering high value contributions to discussion.

(2) *Modeling Assignments* – Part of your grade will be based on a short writing assignment that will ask you to model a decision or interaction that you have either been involved in or observed. You will be asked to describe a decision and then use the tools and methods we learn in class to develop a model of the decision as well as an analysis of whether the decision was good or bad (and why). Assignments should be approximately 2 pages in

length (1 page of written description and analysis and one page to illustrate the model). Late work will not be accepted. However, it is possible that at some point in the semester you will have the opportunity to do a second modeling exercise. In this event, only your highest grade will count, however, there is no guarantee that this will happen since part of the point of this course is to explore the nature of decision making under uncertainty.

(3) *Midterms* – There will be three midterms. The first will test material covered in the first two weeks of class as well as some basic probability theory, but will only be worth a small fraction of your grade. The second and third midterms will cover more material and will, accordingly, be worth more. The format of each midterm will be made clear in the weeks leading up to the exam. They will always involve one or more problems for you to work through and may involve an essay question and/or a take-home component. During the week of the exam I will set aside time in class for you to ask questions about the exam. Additionally, I will hold extended office hours during that week so that you have the opportunity to ask questions outside of class. *Midterms cannot be made up at a later date unless you notify me prior to your absence.*

(4) *Final Exam* – There will be a comprehensive final exam covering material from all three parts of the course. As with the midterm the format of the final exam will be made clear in the weeks leading up to the exam, and we will devote at least part of the last week of class to review for the final. The date for the final exam will be dictated by the University exam schedule.

4. Policies

Attendance, Holidays, and Absences

Attendance is expected in this course, however, you will not be graded on the basis of your attendance and missing a few classes will not significantly impact your grade. That said, regular participation in class discussions and experiments provides a benefit to your classmates and so those who participate will have their contributions reflected in their grades.

In accordance with University policy the course will observe all holidays recognized in the official University Academic Calendar. We will not meet on University holidays, nor will work be assigned to be done on those days. Additionally, holidays or special events observed by organized religions will be honored for those students who affiliate with a particular religion, and absences either pre-approved by the Dean of Students (or Dean's designee) or associated with a serious medical condition will also be honored.

Students with Disabilities

In compliance with ADA guidelines, students who have any condition, either permanent or temporary, that might affect their ability to perform in this class are encouraged to contact the Office of Disability Services. If you will need to utilize your approved accommodations in this class, please follow the proper notification procedure for informing your professor(s). This notification process must occur more than a week before any accommodation can be utilized. Please contact Disability Services at (714) 516-4520 or (www.chapman.edu/students/student-health-services/disability-services) if you have questions regarding this procedure, or for information and to make an appointment to discuss and/or request potential accommodations based on documentation of your disability. Once formal approval of your need for an accommodation has been granted, you are encouraged to talk with your professor(s) about your accommodation options. The granting of any accommodation will not be retroactive and cannot jeopardize the academic standards or integrity of the course.

Chapman University Academic Integrity Policy

Chapman University is a community of scholars, which emphasizes the mutual responsibility of all members to seek knowledge honestly and in good faith. Students are responsible for doing their own work, and academic dishonesty of any kind will not be tolerated anywhere in the university. If you ever have any questions about what this policy requires of you please contact me *before you turn in the relevant work.*

Equity and Diversity

Chapman University is committed to ensuring equality and valuing diversity. Students and professors are reminded to show respect at all times as outlined in Chapman's Harassment and Discrimination Policy: <http://tinyurl.Com/CUHarassment-Discrimination>. Any violations of this policy should be discussed with the professor, the Dean of Students and/or otherwise reported in accordance with this policy.

5. Schedule

Readings marked as pdf are available on Blackboard.

Week 1 – Introduction to Decision Theory

Monday February 3 – Introduction

Wednesday February 5 – Building blocks of decision theory

Read: Resnik Chapter 1; Gaus Chapter 1

Week 2

Monday February 10 – Decision trees, ordinal preferences

Wednesday February 12 – Cont.

Read: Resnik Chapters 2-3

Prepare: Problem set #1

Week 3

Monday February 17 – Utility functions, cardinalizing preferences, probability

Wednesday February 19 – Probability cont.

Read: Resnik Chapters 3-4

Prepare: Problem set #2

Week 4

Monday February 24 – Maximizing expected utility

Wednesday February 26 – Cont.

Read: Resnik Chapter 4; Gaus Chapter 2

Week 5

Monday March 2 – Paradoxes of rationality (Allais, Ellsberg paradoxes)

Prepare: MIDTERM #1 (Take home; to be turned in at start of class Monday, March 2; due date extended from Wed, Feb 26)

Wednesday March 4 – Paradoxes cont. (Newcomb's Problem)

Read: Resnik Chapter 4; Schmidt & Wright "What Nozick Did for Decision Theory" (pdf)

Week 6 – Game Theory

Monday March 9 – Introduction to game theory

Wednesday March 11 – Sequential games and backwards induction

Read: Resnik Chapter 5; Gaus Chapter 4;

Watch: Game Theory 101 Youtube videos posted on Blackboard

Week 7 [Classes moving online]

Monday March 16 – Positive and zero-sum games

Wednesday March 18 – Cont.

Read: Nozick on Prisoner's Dilemma (pdf)

Watch: Game Theory 101 Youtube videos posted on Blackboard

Prepare: Problem set #3 (posted online by Monday March 16, can be submitted via email as Word document or scan/picture of printout)

Week 8 – SPRING BREAK, NO CLASS

Week 9

Monday March 30 – Live Zoom discussion 5:30-6:45PM PST [Midterm review]

Wednesday April 1 – MIDTERM #2 (Rescheduled from March 18, format TBA)

Week 10

Wednesday April 8 – Live Zoom discussion 5:30-6:45PM PST

Watch: Recorded lectures on mixed strategy Nash equilibria and repeated games

Read: Resnik Chapter 5, Game Theory 101 1.5

Week 11-- Social Choice Theory

Wednesday April 15 – Live Zoom discussion 5:30-6:45PM PST

Prepare: Problem set #4 upload by 5:00PM Wed

Watch: Recorded lecture introducing social choice theory

Week 12

Wednesday April 22 – Live Zoom discussion 5:30-6:45PM PST

Prepare: Problem set #5 upload by 5:00PM Wed

Watch: Recorded lecture on social choice theory

Read: Resnik Chapter 6; Gaus Chapter 5; Sen “The Possibility of Social Choice” (pdf) (these readings cover material from weeks 11-13)

Week 13

Wednesday April 29 – Live Zoom discussion 5:30-6:45PM PST [Midterm review]

Prepare: MIDTERM #3 due Friday, details announced via email

Watch: Recorded lecture on social choice theory

Week 14

Wednesday May 6– Live Zoom discussion 5:30-6:45PM PST

Prepare: Modeling assignment due by Friday, May 8, 11:59PM (extensions fine)

Watch: Recorded lecture on heuristics and biases

Week 15

Wednesday May 13– Live Zoom discussion 5:30-6:45PM PST [Final exam review]

Prepare: Bonus online modeling assignment presentations due Wednesday; quiz on presentations will be available to take on Blackboard late in the week (details to be announced)

Watch: Modeling assignment presentations

Week 16 – FINAL EXAM WEEK

Wednesday May 20 – Scheduled final exam time is 4:15pm-6:45pm