

## PHPE 400 - Individual and Group Decision Making

Instructor:	Eric Pacuit (pacuit.org)
Semester:	Fall 2024
Email:	epacuit@umd.edu
Course Website:	<a href="https://umd.instructure.com/courses/1370492">https://umd.instructure.com/courses/1370492</a>
Class Times:	MW 12:00pm - 12:50pm
Location:	TWS 1310
Office Hours:	TBA
Office:	Skinner 1103A

### Course Description

This course examines the foundational issues that arise in the study of mathematical models of decision-making at both the individual and group levels, and explores their key applications in philosophy, politics, and economics. The course is structured around three core areas: **decision theory**, which explores how individuals make choices under uncertainty; **game theory**, which analyzes strategic interactions among rational agents; and **social choice theory**, which investigates how groups arrive at collective decisions.

We will cover a range of topics, including ordinal and cardinal utility theory, the Allais and Ellsberg paradoxes, an introduction to game theory concepts, voting methods and paradoxes, and utility aggregation. Core theorems such as May's Theorem, Arrow's Impossibility Theorem, and the Condorcet Jury Theorem will be critically examined. If time permits, we will also explore additional topics such as Newcomb's Paradox, strategic voting, Sen's Impossibility of the Paretian Liberal, and the complexities of gerrymandering.

The readings for this course are interdisciplinary, drawing on sources from economics, philosophy, political science, psychology, and statistics.

### Philosophy, Politics and Economics Major

This is a required course in the new Philosophy, Politics and Economics major. For more information about the PPE major, consult the program website or contact Dan Moller (dmoller@umd.edu).

### Course Objectives

The primary goal of this course is to equip students with the formal reasoning and analytical skills essential for research at the intersection of philosophy, politics, and economics. Upon successful completion of this course, students will be able to:

1. Critically evaluate the mathematical models used to represent individual and group decision-making processes.

2. Articulate and analyze the underlying assumptions of key theorems in decision theory and social choice, such as May's Theorem, Arrow's Impossibility Theorem, and the Condorcet Jury Theorem.
3. Compare, contrast, and assess various methods for collective decision-making, recognizing their strengths and limitations.
4. Apply rational choice models to address problems in philosophy, politics, and economics.

## Required Resources

- Course Website: <https://umd.instructure.com/courses/1370492>
- Tophat Account: <https://app.tophat.com/e/616833>. *You must purchase a Tophat pro account.* The join code is **616833**.
- This term we will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from both me and your classmates. Rather than emailing questions to me, I encourage you to post your questions on Piazza.
- Readings: There is no textbook to purchase for this course. The course will be based on readings from various textbooks are journal articles. The relevant material will be made available on the course website. Many of the readings will be chapters from the following textbooks:
  - Daniel Hausman, *Preference, Value, Choice and Welfare*, Cambridge University Press, 2012.
  - Daniel Hausman, Michael McPheerson, and Debra Satz, *Economic Analysis, Moral Philosophy, and Public Policy*, Cambridge University Press, 2017.
  - Julian Reiss, *Philosophy of Economics: A Contemporary Introduction*, Routledge, 2013.
  - Martin Peterson, *An Introduction to Decision Theory*, 2nd Edition, Cambridge University Press, 2017.
  - G. Gaus and J. Thrasher, *Philosophy, Politics, and Economics: An Introduction*, Princeton University Press, 2021.

In addition, there are online notes (<https://notes.phpe400.info>) covering some of the material discussed in the course.

## Course Structure

This course will have weekly lectures on Mondays and Wednesdays 12:00pm - 12:50pm. During the lectures, we will introduce the material for the week, discuss the readings, and work together on participation questions. Every Friday, students must attend a discussion section. The discussion sections will offer additional opportunities to practice the material presented in class, and answer any questions about the problem sets.

## Grading Policy

The course requirements are:

- **Participation:** There will be weekly “participation questions” assigned via Tophat (<https://app.tophat.com/e/616833>). Almost all the questions will be asked and answered during the lectures or sections. Some questions will be graded for participation only (i.e., you get full credit as long as you answer the question before the deadline) and other questions will be graded for correctness (i.e., you get 0.5 points for participation and 0.5 points for correctness). *You are encouraged to discuss these problems with your classmates.* You will be given a chance to correct any mistakes on the participation questions answered during lectures or the discussion section. The deadline for correcting participation questions are as follows:
  - All participation questions for weeks 1 - 7 must be completed before the end of the 7th week.
  - All participation questions for weeks 10 - 16 must be completed before the final exam.
- **Problem Sets:** There will be 10-12 problem sets. Problem sets will be submitted through Gradescope (accessible through the course website). You can use your notes, the readings, and the online textbook, but you should not discuss your answers with your classmates or use any AI tools, such as ChatGPT, to answer these questions.

Problem sets are **due Fridays at 11pm**. The penalty for late problem sets is as follows:

1. Problem sets submitted less than 24 hours after the due date (so, before Saturday at 11pm): no late penalty.
  2. Problem sets submitted after Saturday at 11pm and *before class on Monday*: assignments will be graded, and a small late penalty may be applied (1% - 10% of the total number of points may be deducted).
  3. Problem sets submitted after class on Monday (without a valid excuse): the problem set will be lightly graded, and you will receive at most 1/2 the total points for the assignment.
- **Exams:** There will be 2 exams given during the semester:
    - **Midterm:** The midterm will contain an in-person portion and an online portion. The in-person portion will be given during the lecture time and the online portion will be given on Gradescope. The midterm is tentatively scheduled for the beginning of week 7.
    - **Final Exam:** The final will be cumulative (though more emphasis on material after the midterm exam) and given during finals week. Consult <https://app.testudo.umd.edu/soc/exam/> for more information about the time and location of the final exam.

Grades will be assigned according to the following weights:

Participation	30%
Problem Sets	40%
Midterm	15%
Final Exam	15%

Your final grade may be curved, but the final grade cutoffs are typically as follows:

A+	> 100%	B+	88%	C+	78%	D+	68%	F	< 60%
A	93%	B	83%	C	73%	D	63%		
A-	90%	B-	80%	C-	70%	D-	60%		

See undergraduate catalogue for description of grades, e.g., A+, A, A-, etc.: <https://registrar.umd.edu/current/Policies/acadregs.html#plusminus>.

## Tentative Syllabus

Below is a list of topics and tentative syllabus for this semester. This is subject to change. Please consult the course website for an up-to-date overview of the material discussed in the course.

- Rational preferences
  - representing preferences as relations
  - transitivity
  - completeness
  - maximal elements
- Expected utility theory
  - ordinal and cardinal utility functions
  - expected utility vs. expected value
  - lotteries and preferences over lotteries
  - independence axiom
  - Allais and Ellsberg paradox
  - the economist's dilemma
- Decision theory
  - decision matrices
  - strict and weak dominance
  - Newcomb's paradox
- Introduction to game theory
  - strategic games
  - Nash equilibrium

- coordination games
- symmetric games: Prisoner's dilemma, stag hunt, chicken
- the ultimatum game

- Voting

- a survey of voting methods: Plurality, Borda, Instant Runoff Voting, Coombs, Copeland, Minimax, Split Cycle
- Condorcet winner/Condorcet loser
- voting paradoxes
- from voting theory to electoral reform

- Topics in social choice theory

- justifying majority rule: May's Theorem
- Condorcet jury theorem
- Multiple elections paradox
- Judgement aggregation paradoxes
- Arrow's Theorem
- Evaluative voting

- Aggregating utilities

- interpersonal comparisons of utility
- social welfare functions: Sum Utilitarian, Lexicographic Minimax
- Criticisms of utilitarianism

Date	Topic
8/26 8/28	Introduction, Rational preferences
<b>9/2</b> 9/4	<b>No class - Labor Day</b> Rational preferences
9/9 9/11	Expected utility theory
9/16 9/18	Expected utility theory
9/23 9/25	Expected utility theory Decision theory
9/30 10/2	Decision theory
10/7 10/9	Midterm Exam Introduction to game theory
10/14 10/16	Introduction to game theory

Date	Topic
10/21 10/23	Voting
10/28 10/30	Voting
11/4 11/6	Topics in social choice theory
11/11 11/13	Topics in social choice theory
11/18 11/20	Topics in social choice theory
11/25 <b>11/27</b>	Aggregating utilities <b>No class - Thanksgiving break</b>
12/2 12/4	Aggregating utilities
12/9	Review

## Course Policies

A full list of course-related policies and relevant links to resources may be found at:

<http://www.ugst.umd.edu/courserelatedpolicies.html>.

**Communication about this Course** I will use ELMS announcements and Piazza ([https://umd.instructure.com/courses/1370492/external\\_tools/42711](https://umd.instructure.com/courses/1370492/external_tools/42711)) to convey important information, and students are responsible for keeping their email address up to date, and must ensure that forwarding to another email address functions properly. Failure to check email, errors in forwarding, and returned email are the responsibility of the student, and do not constitute an excuse for missing announcements or deadlines.

**Names/Pronouns and Self-Identifications** The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). The pronouns someone indicates are not necessarily indicative of their gender identity. Visit [trans.umd.edu](http://trans.umd.edu) to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

**Accessibility and Disability Services** The University of Maryland is committed to creating and maintaining a welcoming and inclusive educational, working, and living environment for people of all abilities. The University of Maryland is also committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the University, or be subjected to discrimination. The Accessibility & Disability Service (ADS) (<https://www.counseling.umd.edu/ads/>) provides reasonable accommodations to qualified individuals to provide equal access to services, programs and activities. ADS cannot assist retroactively, so it is generally best to request accommodations several weeks before the semester begins or as soon as a disability becomes known.

For assistance in obtaining an accommodation, contact Accessibility and Disability Service at 301-314-7682, or email them at [adsfrontdesk@umd.edu](mailto:adsfrontdesk@umd.edu).

## Student Resources and Services

- Note taking assistance (<https://counseling.umd.edu/ads/notetakers>)
- Counseling Center (<https://www.counseling.umd.edu/>)
- UMD's Student Academic Support Services website (<http://tutoring.umd.edu/>)
- UMD's Writing Center (<http://www.english.umd.edu/academics/writingcenter/schedule>)
- UMD's Student Resources and Services website (<https://sph.umd.edu/content/student-resources-and-services>)

- Basic Needs Security (<https://studentaffairs.umd.edu/basic-needs-security>)

**Class Cancellations** The University may be closed in the event of an emergency, in which case class will be cancelled. To find out if the University is closed you can check its main site (<http://www.umd.edu>), its emergency preparedness site (<http://www.umd.edu/emergencypreparedness/>), or call the “snow phone line” at 301-405-7669 (which covers more than just snow caused closings). If class is cancelled while the University remains open, then there will be an announcement posted on the course ELMS page.

**Emergency Protocol:** In the case of an extended closure to the University (e.g., because of inclement weather), consult the ELMS course page for announcements and changes to any due dates.

**Attendance and Absences** Students are expected to attend classes regularly. Consistent attendance offers students the most effective opportunity to gain command of course concepts and materials. Events that justify an excused absence include: religious observances; mandatory military obligation; illness of the student or illness of an immediate family member; participation in university activities at the request of university authorities; and compelling circumstances beyond the student’s control (e.g., death in the family, required court appearance). Absences stemming from work duties other than military obligation (e.g., unexpected changes in shift assignments) and traffic/transit problems do not typically qualify for excused absence. Students claiming an excused absence must notify the course instructor in a timely manner and provide appropriate documentation. The notification should be provided either prior to the absence or as soon afterwards as possible. In the case of religious observances, athletic events, and planned absences known at the beginning of the semester, the student must inform the instructor during the schedule adjustment period. All other absences must be reported as soon as is practical. The student must provide appropriate documentation of the absence. The documentation must be provided in writing to the instructor by the means specified in this syllabus. The full university attendance/absence policy can be found here: <http://www.ugst.umd.edu/courserelatedpolicies.html>.

**Academic Integrity** The UMD Honor Code prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents and forging signatures. On every examination, paper or other academic exercise not exempted by the instructor, students must write by hand and sign the following pledge:

*I pledge on my honor that I have not given or received any unauthorized assistance on this examination (or assignment).*

Allegations of academic dishonesty will be reported directly to the Student Honor Council: <https://studentconduct.umd.edu/>

**Copyright Notice** Class lectures and other materials are copyrighted. They are the property of the instructor - do not sell them, do not post them on a website. They may not be reproduced for anything other than personal use without written permission from the instructor. Copyright infringements may be referred to the Office of Student Conduct.

**Academic Accommodations for Students who Experience Sexual Misconduct** The University of Maryland is committed to providing support and resources, including academic accommodations, for students who experience sexual or relationship violence as defined by the University's Sexual Misconduct Policy. To report an incident and/or obtain an academic accommodation, contact the Office of Civil Rights and Sexual Misconduct at 301-405-1142. If you wish to speak confidentially, contact Campus Advocates Respond and Educate (CARE) to Stop Violence at 301-741-3555. As 'responsible university employees' faculty are required to report any disclosure of sexual misconduct, i.e., they may not hold such disclosures in confidence. For more information: <http://www.umd.edu/ocrsm/>

**Diversity** The University of Maryland values the diversity of its student body. Along with the University, I am committed to providing a classroom atmosphere that encourages the equitable participation of all students regardless of age, disability, ethnicity, gender, national origin, race, religion, or sexual orientation. Potential devaluation of students in the classroom that can occur by reference to demeaning stereotypes of any group and/or overlooking the contributions of a particular group to the topic under discussion is inappropriate.

For information on elms, counseling, health, learning workshops, tutoring, writing help, student rights in undergrad courses, questions about graduation or add/drop/withdraw, please see <http://www.ugst.umd.edu/courserelatedpolicies.html>.