

## PHPE 400 - Individual and Group Decision Making

|                 |   |
|-----------------|---|
| Instructor:     | Eric Pacuit (pacuit.org)  |
| Semester:       | Fall 2025   |
| Email:          | epacuit@umd.edu   |
| Course Website: | <a href="https://umd.instructure.com/courses/1390147">https://umd.instructure.com/courses/1390147</a> |
| Class Times:    | MW 12:00pm - 12:50pm  |
| Location:       | TWS 0310  |
| Office Hours:   | Tuesdays, 11:am - 12:00pm   |
| 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.

### 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/1390147>
- Tophat Account: [https://umd.instructure.com/courses/1390147/external\\_tools/81891](https://umd.instructure.com/courses/1390147/external_tools/81891). *You must purchase a Tophat pro account.* The join code is **209898**.
- 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 and 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 McPheeerson, 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://umd.instructure.com/courses/1390147/external\\_tools/81891](https://umd.instructure.com/courses/1390147/external_tools/81891)). Almost all the questions will be asked and answered during the lectures or sections. Some questions are “survey questions” that 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:

- Any survey question *must be answered during the lecture or discussion section.*
- All participation questions that are graded for correctness assigned in a week will be due by **Friday at 11pm of the following week.**
- Each student can ask for **at most 3 extensions** to complete the participation questions for a week.

- **Problem Sets:** There will be 10-12 problem sets. Problem sets will be submitted 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 course website.
- **Final Exam:** The final will be cumulative (though more emphasis on material after the midterm exam) and given during finals week. Consult <https://registrar.umd.edu/registration/register-classes/final-exams> 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  | 30% |
| Midterm       | 20% |
| Final Exam    | 20% |

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

|    |        |    |     |    |     |    |     |   |       |
|----|--------|----|-----|----|-----|----|-----|---|-------|
| A+ | > 100% | B+ | 87% | C+ | 77% | D+ | 67% | F | < 60% |
| A  | 92%    | B  | 82% | C  | 72% | D  | 62% |   |       |
| A- | 90%    | B- | 80% | C- | 70% | D- | 60% |   |       |

## 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

- Important games: coordination 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  |
|----------------|--|
| 9/3            | Introduction, Rational preferences                           |
| 9/8<br>9/10    | Rational Preferences   |
| 9/15<br>9/17   | Expected utility theory                                      |
| 9/22<br>9/24   | Expected utility theory<br>Evaluating rational choice axioms |
| 9/29<br>10/1   | Evaluating rational choice axioms<br>Decision theory         |
| 10/6<br>10/8   | Decision theory<br>Introduction to game theory               |
| <b>10/13</b>   | <b>No Class: Fall Break</b>                                  |
| 10/15          | Introduction to game theory                                  |
| 10/20<br>10/22 | Introduction to game theory<br><b>Midterm Exam</b>           |

| Date                  | Topic   |
|-----------------------|---|
| 10/27<br>10/29        | Voting  |
| 11/3<br>11/5          | Voting  |
| 11/10<br>11/12        | Topics in social choice theory  |
| 11/17<br>11/19        | Topics in social choice theory  |
| 11/24<br><b>11/26</b> | Topics in social choice theory<br><b>No Class: Thanksgiving Break</b> |
| 12/1<br>12/3          | Aggregating utilities   |
| 12/8<br>12/10         | Aggregating utilities   |
| 12/19                 | <b>Final Exam</b>   |

## Course Policies & Resources

- All course related policies and resources for undergraduate students:  
<http://www.ugst.umd.edu/courserelatedpolicies.html>.
- Campus land acknowledgement statement  
<https://admissions.umd.edu/student/land-acknowledgement>

**Communication about this Course** I will use ELMS announcements and Piazza ([https://umd.instructure.com/courses/1390147/external\\_tools/42711](https://umd.instructure.com/courses/1390147/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.

**Communication with Peers** With a diversity of perspectives and experience, we may find ourselves in disagreement and/or debate with one another. As such, it is important that we agree to conduct ourselves in a professional manner and that we work together to foster and preserve a virtual classroom environment in which we can respectfully discuss and deliberate controversial questions.

I encourage you to confidently exercise your right to free speech—bearing in mind, of course, that you will be expected to craft and defend arguments that support your position. Keep in mind, that free speech has its limit and this course is NOT the space for hate speech, harassment, and derogatory language. I will make every reasonable attempt to create an atmosphere in which each student feels comfortable voicing their argument without fear of being personally attacked, mocked, demeaned, or devalued.

Any behavior (including harassment, sexual harassment, and racially and/or culturally derogatory language) that threatens this atmosphere will not be tolerated. Please alert me immediately if you feel threatened, dismissed, or silenced at any point during our semester together and/or if your engagement in discussion has been in some way hindered by the learning environment.

**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 the campus' list of Gender Inclusive Resources 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.

**Academic Integrity** The University's Code of Academic Integrity is designed to ensure that the principles of academic honesty and integrity are upheld. In accordance with this code, academic

dishonesty will not be tolerated. Please ensure that you fully understand this code and its implications because all acts of academic dishonesty will be dealt with in accordance with the provisions of this code. All students are expected to adhere to this Code. It is your responsibility to read it and know what it says, so you can start your professional life on the right path.

It is important to note that course assistance websites, such as CourseHero, or AI-generated content are not permitted sources, unless the instructor explicitly gives permission. Material taken or copied from these sites can be deemed unauthorized material and a violation of academic integrity. These sites offer information that may be inaccurate or biased and that shortcut the learning process, particularly the critical thinking steps necessary for college-level assignments.

Additionally, it is understandable that students may use a variety of online or virtual forums for course-wide discussion (e.g., Group lists or chats). Collaboration in this way regarding concepts discussed in this course is permissible. However, collaboration on graded assignments is strictly prohibited unless otherwise stated. Examples of prohibited collaboration include: asking classmates for answers on quizzes or exams, asking for access codes to clicker polls, etc.

Finally, on each exam or assignment you must write out and sign the following pledge:

***“I pledge on my honor that I have not given or received any unauthorized assistance on this exam/assignment.”***

Please visit the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

**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) 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. Any student who needs accommodations should contact me as soon as possible so that I have sufficient time to make arrangements.

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** Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit UMD's Student Academic Support Services website to learn more about the wide range of campus resources available to you.

In particular, everyone can use some help sharpening their writing skills (and improving their grade) by visiting UMD's Writing Center and schedule an appointment. For consulting and training in oral communication, please visit UMD's Oral Communication Center.

You should also know there are a wide range of resources to support you with whatever you might need (UMD's Student Resources and Services website may help). If you feel it would be

helpful to have someone to talk to, visit UMD's Counseling Center or one of the many other mental health resources on campus.

**Notice of Mandatory Reporting** Notice of mandatory reporting of sexual assault, sexual harassment, interpersonal violence, and stalking: As a faculty member, I am designated as a "Responsible University Employee," and I must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to UMD's Title IX Coordinator per University Policy on Sexual Harassment and Other Sexual Misconduct.

If you wish to speak with someone confidentially, please contact one of UMD's confidential resources, such as CARE to Stop Violence (located on the Ground Floor of the Health Center) at 301-741-3442 or the Counseling Center (located at the Shoemaker Building) at 301-314-7651.

You may also seek assistance or supportive measures from UMD's Title IX Coordinator, Angela Nastase, by calling 301-405-1142, or emailing [titleIXcoordinator@umd.edu](mailto:titleIXcoordinator@umd.edu).

To view further information on the above, please visit the Office of Civil Rights and Sexual Misconduct's website.

**Basic Needs Security** If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, please visit UMD's Division of Student Affairs website for information about resources the campus offers you and let me know if I can help in any way.

**Veteran Resources** UMD provides some additional supports to our student veterans. You can access those resources at the office of Veteran Student Life. Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities) are welcome and encouraged to communicate these, in advance if possible, to the instructor.

**Technology Policy** Please refrain from using cellphones, laptops, and other electronic devices during class sessions unless we have designated such use as part of a class exercise. Further, video recording of class sessions or activities is prohibited without advance permission from the professor.

## Participation

- Given the interactive style of this class, attendance will be crucial to note-taking and thus your performance in this class. Attendance is particularly important also because class discussion will be a critical component for your learning.
- Each student is expected to make substantive contributions to the learning experience, and attendance is expected for every session.
- Students with a legitimate reason to miss a live session should communicate in advance with the instructor, except in the case of an emergency.
- Students who miss a live session are responsible for learning what they miss from that session.
- Additionally, students must complete all readings and assignments in a timely manner in order to fully participate in class.

**Course Evaluation** Please submit a course evaluation through Student Feedback on Course Experiences in order to help faculty and administrators improve teaching and learning at Maryland. All information submitted to Course Experiences is confidential. Campus will notify you when Student Feedback on Course Experiences is open for you to complete your evaluations at the end of the semester. Please go directly to the Student Feedback on Course Experiences to complete your evaluations. By completing all of your evaluations each semester, you will have the privilege of accessing through Testudo the evaluation reports for the thousands of courses for which 70% or more students submitted their evaluations.

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