



PHIL 258 Probability and Rational Choice

Units: 4

Fall 2026—Mondays and Wednesdays—15:30–16:50

Location: Room 101, Mudd Hall of Philosophy (MHP)

Instructor: Dmitri Gallow

Office: 205 Mudd Hall

Office Hours: Before lecture, from 14:00–15:00, Mondays and Wednesdays

Contact Info: dmitri.gallow.teaching@gmail.com

Teaching Assistant: Zhanming Gu

Contact Info: zhanming@usc.edu

Readings

Odds & Ends, by Jonathan Weisberg. Available online at jonathanweisberg.org/vip/

An Introduction to Decision Theory, by Martin Peterson. Cambridge University Press. 2017.

Course Description

This course offers an introduction to the theories of probability and rational choice, with particular emphasis on philosophical foundations.

Learning Objectives

By the end of the course, students will be able to calculate probabilities, model decisions, and determine what various theories of rational choice say about how to choose in those decisions. They will also understand some of the philosophical controversies about the interpretation of probability and the theory of rational choice.

Evaluation

Final grades will be determined by four components:

Midterm*	35%
Final*	35%
Problem Sets	20%
Recitation Section	10%

* The midterm and final are mandatory. If you never take a midterm or never take a final, you will not pass the course.

For each of these four components, you will be assigned a letter grade. Each letter grade corresponds to a number between 0 and 10:

Letter :	A+	A	A-	B+	B	B-	C+	C	C-	D	F
Number:	10	9	8	7	6	5	4	3	2	1	0

Using these numbers, your grade for the course will be determined by the calculation:

$$[\text{Course}] = 35\% \times [\text{Midterm}] + 35\% \times [\text{Final}] + 20\% \times [\text{Problem Sets}] + 10\% \times [\text{Section}]$$

I will round to the nearest whole number.

Midterm and Final

There will be an in-class midterm on March 11th, and a (cumulative) final on Friday, May 8th (in our usual classroom, from 2:00–4:00pm). About a week before the midterm and final, I will distribute a practice midterm/final. The actual midterm and final will have exactly the same format, but with different questions.

Problem Sets

To help you learn the material, you will have 9 problem sets due throughout the semester—at a pace of roughly one problem set per week. To incentivize you keeping up with the material, these problem sets will be graded for correctness, and will determine 20% of your grade.

Recitation

10% of your grade will be determined by your participation in recitation section.

Course Schedule¹

DATE	QUESTIONS
Jan 12	Course Introduction Reading: <i>Syllabus</i> Puzzle: <i>The Monty Hall Problem</i>
§1: PROBABILITY	
Jan 14	Probabilities can be unexpected; how can we start to calculate them? Reading: <i>O & E: The Monty Hall Problem</i>
Jan 21	What is it for an inference to be <i>valid</i> ? What is it for an inference to be <i>strong</i> ? Reading: <i>O & E: Logic</i> Puzzle: Strategizing to correctly call a fair coin toss
Jan 26	How can we tell when an argument is valid? <i>O & E: Truth-Tables</i>
Jan 28	What does it mean to say that two propositions are probabilistically independent? Reading: <i>O & E: The Gambler's Fallacy</i> Puzzle: Penny's game Problem set #1 due
Feb 2	Rules for calculating probabilities Reading: <i>O & E: Calculating Probabilities</i>
Feb 4	What are <i>conditional</i> probabilities? Reading: <i>O & E: Conditional Probability</i> Puzzle: Three Prisoner's Paradox

¹This course schedule may be revised as the course progresses.

Feb 9 More rules for calculating probabilities
Reading: *O&E: Calculating Probabilities, day 2*
Problem set #2 due

Feb 11 How do we calculate *conditional* probabilities?
Reading: *O&E: Bayes' Theorem*
Puzzle: Medical Test

Feb 18 More rules for calculating conditional probabilities
Reading: *O & E: Multiple Conditions*
Problem set #3 due

Feb 23 Probabilities and Inductive Inference
Reading: *O & E: Probability and Induction*
Puzzle: The Ravens Paradox

§2: DECISION-MAKING

Feb 25 How should we start to approach a decision?
Reading: *Peterson, chapter 2: The Decision Matrix*
Problem set #4 due

Mar 2 Is a decision matrix enough?
Reading: *Peterson, chapter 3: Decisions under Ignorance, sections 3.1–3.4*
Puzzles: Rawls' 'Veil of Ignorance', the Prisoners' Dilemma

Mar 4 Is a decision matrix enough (day 2)?
Reading: *Peterson, chapter 3: Decisions under ignorance, sections 3.5–3.6*
Puzzle: Bertrand's Paradox
Optional video: *Grant Sanderson, Bertrand's Paradox (Numberphile video)*

Mar 9 What are expected values? How can we use them to make decisions?
Reading: *O&E: Expected Value*
Puzzle: the 'problem of the points'
Problem set #5 due

Mar 11 **MIDTERM**

Mar 23 What kind of values are we trying to maximize?
Reading: *Peterson, section 4.6*
Puzzle: The Saint Petersburg Paradox

Mar 25 What is utility? How can we measure it?
Reading: *O&E: Utility*
Puzzle: Interpersonal comparisons of utility

§3: THE PHILOSOPHY OF DECISION-MAKING

Mar 30 Should we always maximize expected utility?
Reading: *O&E: Challenges to Expected Utility*
Reading: *Peterson: sections 4.4 and 4.5*
Puzzles: The Allais and Ellsberg Paradoxes
Problem set #6 due

Apr 1	Should we always maximize expected utility? Reading: <i>O&E: Infinity & Beyond</i> Reading: <i>Peterson, sections 4.6 and 4.7</i> Puzzle: Pascal's Wager
Apr 6	Should we always maximize expected utility? Reading: <i>Peterson, sections 4.7 and 4.8</i> Puzzle: The Two-Envelope Paradox Problem set #7 due
Apr 8	Act-State Dependence: Evidential and Causal Decision Theory Reading: <i>Peterson, section 9.1</i> Puzzles: Newcomb's Problem and Prisoner's Dilemma with a Twin
Apr 13	Objections to Evidential and Causal Decision Theory Reading: <i>Peterson, sections 9.2 and 9.3</i> Puzzle: Transparent Newcomb, Chicken with a Twin
§4: THE PHILOSOPHY OF PROBABILITY	
Apr 15	What is probability? Is it objective or subjective? Reading: <i>O&E: Two Schools</i> Puzzle: The Reference Class Problem Problem set #8 due
Apr 20	Subjectivism about Probability Reading: <i>O & E: Belief and Betting Rates</i>
Apr 22	Dutch-book Arguments for Probabilism Reading: <i>O&E: Dutch Books</i>
Apr 27	Accuracy Arguments for Probabilism Reading: <i>Pettigrew Accuracy and the Laws of Credence (selections)</i>
Apr 29	Catch-up and Review Reading: <i>Practice Final</i> Problem set #9 due
May 8	FINAL , in our usual classroom, from 2:00–4:00pm

Laptop and Smartphone Policy

There is a large body of empirical evidence showing that using laptops and smartphones during lecture leads to lower long-term comprehension and worse grades.

For instance, [Glass & Kang](#) allowed college students to use electronic devices in half of the lectures for a course, and tested comprehension with in-class quizzes and a final exam. They found that, for material taught with electronic devices, students did as well with *in-class* quizzes but did significantly worse on the final exam. Their conclusion is that college students can *comprehend* material, even when their attention is divided between lecture and electronic devices, but they cannot *retain* the material nearly as well when their attention is divided.

Other studies have found similarly negative correlations between smartphone use and academic performance. [Kuznekoff & Titsworth](#) found that students who did not have smartphones with them during the lecture were able to recall more detailed information from lecture and scored a full letter grade and a half higher than those

students who had their smartphones with them. [Kim et al](#) found that in-class smartphone use had a negative correlation with final grades. [Wood et al](#) found that students not using smartphones outperformed students with smartphones. [Ravizza, Hambrick, and Fenn](#) found that, even amongst students with higher ACT scores, increased use of laptops and smartphones was associated with lower exam scores. A [meta-analysis](#) looked at 63 studies, including 124,166 students, and concluded that “increased use of [smartphones and laptops] was associated with poorer academic outcomes.”

Your smartphone can affect your cognitive ability *even when you're not using it*. [Thornton et al](#) asked college students to perform various cognitive tests. Some students had their phones put out of sight, while others had their phones within sight. Those with their phones in sight performed worse.

In this class, I want you to be at your best. And I want you to retain as much of the material from lecture as possible. So I will not allow you to use laptops or smartphones during lectures. If I see you with a laptop or smartphone out during lecture, I will remind you of this policy and ask you to put it away.

Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the [USC Student Handbook](#). All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or “recycle” work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the [student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Since creating, analytical, and critical thinking skills are part of the learning outcomes of this course, all assignments should be prepared by the student working individually or in groups. Students may not have another person or entity complete any substantive portion of the assignment. Developing strong competencies in these areas will prepare you for a competitive workplace. Therefore, **using AI tools is prohibited in this course, will be identified as plagiarism, and will be reported to the Office of Academic Integrity.**

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Course Content Distribution and Synchronous Session Recording Policies

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording

can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Students and Disability Accommodations

USC welcomes students with disabilities into all of the University's educational programs. The [Office of Student Accessibility Services](#) (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems

Counseling and Mental Health - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

CARE-SC: Confidential Advocacy, Resources, and Education Support Center - (213) 740-9355(WELL) – 24/7/365 on call.

Confidential advocates, prevention educators, and professional counseling teams work to promote a universal culture of consent, as well as prevent and respond to sexual assault, intimate partner violence, stalking, or other relationship harm. Services available to all USC students at no cost.

Office of Civil Rights Compliance - (213) 740-5086

Information about how to get help or help someone affected by harassment, discrimination, retaliation on the basis of a protected characteristic, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

USC Report & Response - (213) 740-2500

The USC Report & Response website is the university's central reporting portal for concerns arising in the academic space or workplace. All concerns will be assessed and referred to the appropriate university office for resolution. Any questions about USC Report & Response or reporting, in general, can be referred to the Office of Professionalism and Ethics at ope@usc.edu.

USC Campus Support and Intervention - (213) 740-0411

Focuses on student success by assisting students in navigating and resolving complex issues through problem solving, presenting options, and connecting to resources.

USC Emergency Information

Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety

For 24 hour emergency assistance or to report a crime: UPC: (213) 740-4321, HSC: (323)-442-1000. For 24 hour non-emergency assistance or information: UPC: (213) 740-6000, HSC: 323-442-1200.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.