

Rational Choice

Units 9.0
Time Sunday, Tuesday: 10:30–11:50 pm
Location CMUQ 2152

Instructor David Emmanuel Gray
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Office hours walk in or by appointment

Course Overview

Description

Most people like to think of themselves as rational. Telling someone “You are not being rational” is normally not a complement. To be irrational is to be foolish, confused, muddled, illogical. But what does it mean to be rational?

This course provides an overview of rational choice theory, which attempts to answer this question as applied to decision making. Aristotle emphasized this field’s importance, arguing that “the origin of action is choice, and that of choice is desire and reasoning: for good action and its opposite cannot exist without a combination of intellect and character”. While I cannot promise to inculcate you with good character, I do aim to develop your intellectual reasoning for good decision making in a variety of contexts. In particular, this course will stress the role that formal methods play in this analysis. As a result, this course’s approach may be at times more rigorous than you are used to, but its applications remain quite relevant to philosophy, economics, psychology, computer science, statistics—and even your life!

We begin the course by examining choice in situations where there is neither ignorance, nor risk, nor uncertainty involved in the consequences of your decisions. Unfortunately, most decisions are not like this, so we then look at choice under ignorance; that is, when you know the possible consequences but do not know their respective probabilities. Following this, we explore choice under risk and uncertainty—that is, when you do know these probabilities—comparing the von Neumann-Morgenstern theory of expected utility with Savage’s theory of choice under uncertainty. This leads us to end the course by studying the nature of probability. Throughout all this, we examine various formal models, their philosophical underpinnings, and experimental results testing the extent to which the decisions of real people conform to them.

Readings

The following is the required textbook for the course:

- Martin Peterson. *An Introduction to Decision Theory*. Cambridge: Cambridge University Press. 2009.

Additional readings will be made available in PDF format on Blackboard. You are expected to read all the required reading according to the schedule.

Objectives

By the end of this term, I expect that you will be able to:

- Formally represent and analyze decision making in a variety of contexts,
- Assess psychological claims about whether people, in real life, actually conform to canonical theories of rational choice, and
- Form a considered position concerning what you judge to be the most appropriate norms of rational decision making.

Each course requirement is designed with these objectives in mind.

Announcements and Other Communication

Important course information will be posted on Blackboard, so please routinely check for updates at

<http://blackboard.qatar.cmu.edu>

Otherwise, I am glad to answer your questions, discuss your work, or respond to you concerns. Please stop by my office or get in touch via email.

Requirements and Grading

Classes will typically follow an interactive lecture format, with time set aside for seminar-style discussions. As a result, the quality of the course depends critically on each individual’s attention and participation. The purpose of coming together as a class is to engage in philosophical activity together.

I strongly encourage you to discuss the course’s material outside of class with your fellow classmates, friends, and family, as well as with myself. However, all work must be done independently, unless otherwise noted. You are all expected to be familiar with the university policies on cheating and plagiarism. If you have any questions, please ask; do not assume.

Assignments include 11 quizzes, 14 problem sets, and 3 exams. Please refer to page 2 for details.

The total points will vary from assignment to assignment. However, each is ultimately scaled to a score from 0 to 6. Unless you are notified of otherwise, the grading distribution will be as follows:

5.00–6.00	A	3.00–3.99	C	0.00–1.99	R
4.00–4.99	B	2.00–2.99	D		

(For example: the total number of points may be 42; and I may announce that 34 and above is an A, 26 and above is a B, 19 and above is a C, etc. In that case, a score of 32 translates to $4 + 6/8 = 4.75$, which is a B+.) If you wish to know how you are doing in more specific terms than what you can infer from this information, do not hesitate to meet with me. Please note, however: due to Family Educational Rights and Privacy Act (FERPA) regulations, *I will not transmit grade information over email*. All discussion of grades must be done face-to-face with me.

Grades are determined based on *clarity* as well as correctness. You may submit an answer to a question that, arguably, has all the components of a correct answer; but if I have to struggle to understand what you are saying, or read between the lines, or weed out false or irrelevant information, you are unlikely to receive full credit.

Late Policy

In general, no late submissions will be accepted unless a prior reasonable accommodation by me has been requested and granted. Exceptions are made for extreme circumstances, but you must make arrangements with me in advance whenever possible.

Participation and Attendance

Rational choice theory is at times quite intellectual demanding, and so we will work in and out of class with a lot of examples to make it more concrete. Class attendance and participation is therefore very important in understanding and retaining class material. You are expected to participate thoughtfully, to ask questions when you are confused, to take notes, and to have a grasp of what was accomplished in each meeting. *Attendance is therefore required, and anyone showing up more than 15 minutes late will be politely asked to leave and come back (on time) to our next class meeting*. I recognize that not everybody is comfortable speaking in class, and so only absences (in body or mind) will lower your grade. Nevertheless, active class participation can increase your grade. Please refer to page 2 for details.

Assignments

Reading

Most days of class will have an assigned reading (see the course schedule) that you will be expected to have read and thought about before class. This will allow us to devote more time to collaborate in understanding the text. Hence, you need to do more than merely peruse the readings: you must endeavor to understand what the text is trying to convey. Keep in mind that reading decision theory and philosophy is not like reading a novel. There will be times when you have to read slowly and carefully. Sometimes you may have to stop and think about things; and you should be prepared to go back and reread a paragraph if necessary. In some cases, this may take multiple readings to accomplish. However, reading assignments are relatively short so that this is feasible. In addition, it is good to take notes while reading, so that you can remember the text's main points. Finally, feel free to bring questions to class. This material is hardly obvious and it challenges the most intelligent of people.

Participation (10% of Final Grade)

Your base participation grade will consist of your overall grade on all graded assignments (e.g., if the weighted average of your quizzes and exams is a 4.67, then your base participation grade is also 4.67, or a B). Each class absence will lower your participation grade by 0.5 points (i.e., one-half of a letter grade), while each time you are tardy will lower it by 0.25 points (i.e., one-quarter of a letter grade). Being caught sleeping in class, using your cell phone, leaving the classroom, or similar behavior will be treated as an absence or as tardiness depending on the particulars of the circumstances. Note that it is possible that your participation grade can go negative because of these penalties.

On the other hand, active and productive class participation can boost your participation grade by up to 1.00 point (i.e., one letter grade). In addition, if you have perfect attendance and no penalties on your participation grade, then your participation grade will be automatically boosted an additional 1.00 point. Consequently it is possible that your participation grade could go well above 6.00 points. Strive for this—it is the easiest way to increase your final course grade if you are in a borderline situation!

Problem Sets

Throughout the semester, problem sets will be assigned, but neither collected nor graded. The purpose of these problem sets is to allow you to study the course's material as much or as little as you would like. Solutions to many of these problems will be available, so you can check your answers or see me for help as necessary. I do highly encourage you to work on these problem sets with your classmates. You are held individually accountable for this material, however: the majority of problems presented on quizzes and exams will be functionally identical to problems given on the problem sets. As a result, if you do not devote time to the problem sets, you are extremely unlikely to do well on the graded material.

Quizzes (30% of Final Grade)

Throughout the semester, there will be eleven short quizzes, with the lowest one being dropped, so your highest ten will each count for 3% towards your final course grade. These quizzes will assess your understanding of both the reading and what we have covered in class. Generally, they will consist of one or two short-answer problems.


Each quiz will be given promptly at the start of class at 10:30AM and collected fifteen minutes later. If you come in late before they are collected, you will not be given extra time. If you come in after they are collected, you will have missed your chance to take the quiz. *So arrive promptly for class.* Quizzes are announced in advance, but cannot be made up. The reason that one of your quizzes are dropped is so you have the freedom to miss or do poorly on a quiz with no questions asked. To summarize: *there will be no make-up quizzes.*

Exams (60% of Final Grade)

There will be three exams, the first two each count for 15% towards your final course grade and the third for 30%. Each exam will test your comprehension of the course material and consist of problems similar to those seen on the problem sets and quizzes. Exams will be cumulative, though with a significant emphasis on the material covered since the previous exam.

Schedule

wk	Date	Topic/Readings	Assignments
1	8/22 (Sun)	Introduction	Problem set #1 handed out
	8/24 (Tue)	Blaise Pascal: The First Decision Theorist <i>An Introduction to Decision Theory</i> , Introduction to Chapter 2, Sections 2.1–2.3, and Box 2.1. Blaise Pascal, "The Wager" (handout).	
2	8/29 (Sun)	Choice Under Certainty (Unit #1) David Kreps, "Preference Relations and Revealed Preference" (handout).	Quiz #1 Problem set #2 handed out
	8/31 (Tue)	Choice Under Certainty <i>An Introduction to Decision Theory</i> , Introduction to Chapter 8, Sections 8.1 and 8.2, and Box 8.2.	
3	9/5 (Sun)	Choice Under Certainty Amartya Sen, "Maximization and the Act of Choice" (handout).	Quiz #2 Problem set #3 handed out
	9/7 (Tue)	Choice Under Certainty <i>An Introduction to Decision Theory</i> , Introduction to Chapter 5, Section 5.1, and Box 5.1.	
	9/12	 Eid Al-Fitr Break	
4	9/14 (Tue)	Choice Under Certainty <i>An Introduction to Decision Theory</i> , Section 8.3.	Quiz #3 Problem set #4 handed out
5	9/19 (Sun)	Choice Under Ignorance (Unit #2) <i>An Introduction to Decision Theory</i> , Introduction to Chapter 3 and Sections 3.1–3.4.	Quiz #4 Problem set #5 handed out
	9/21 (Tue)	Choice Under Ignorance <i>An Introduction to Decision Theory</i> , Sections 3.5, 3.6, and 2.4, and Boxes 3.2 and 2.2.	
6	9/26 (Sun)	Choice Under Ignorance Michael D. Resnik, "An Application in Social Philosophy: Rawls vs. Harsanyi" (handout).	
	9/28 (Tue)		Exam #1
7	10/3 (Sun)	Choice Under Risk (Unit #3) <i>An Introduction to Decision Theory</i> , Introductions to Chapter 4 and Chapter 6, and Sections 6.1–6.3.	Problem set #6 handed out
	10/5 (Tue)	Choice Under Risk <i>An Introduction to Decision Theory</i> , Section 5.2 and Appendix B.	
8	10/10 (Sun)	Choice Under Risk <i>An Introduction to Decision Theory</i> , Sections 4.1–4.3.	Quiz #5 Problem set #7 handed out
	10/12 (Tue)	Choice Under Risk <i>An Introduction to Decision Theory</i> , Sections 4.4, 4.6, 4.7, and 8.4.	
9	10/17 (Sun)	Choice Under Risk <i>An Introduction to Decision Theory</i> , Sections 8.5, 14.1, and 14.2.	Quiz #6 Problem set #8 handed out
	10/19 (Tue)	Choice Under Risk <i>An Introduction to Decision Theory</i> , Section 14.3.	
10	10/24 (Sun)	Choice Under Risk Amos Tversky, Paul Slovic, and Daniel Kahneman, "The Causes of Preference Reversal" (handout). Sarah Lichtenstein and Paul Slovic, "Transcript from Post-Experimental Interview" (handout).	Quiz #7 Problem set #9 handed out
	10/26 (Tue)	Choice Under Risk Hal R. Arkes and Peter Ayton, "Sunk Cost and Concorde Effects: Are Humans Less Rational Than Lower Animals" (handout).	

wk	Date	Topic/Readings	Assignments
11	10/31 (Sun)		Exam #2
	11/2 (Tue)	Bayesian Decision Theory (Unit #4) <i>An Introduction to Decision Theory</i> , Introduction to Chapter 10 and Sections 10.1–10.3.	Problem set #10 handed out
12	11/7 (Sun)	Bayesian Decision Theory <i>An Introduction to Decision Theory</i> , Introduction to Chapter 7 and Sections 7.1–7.4.	Quiz #8 Problem set #11 handed out
	11/9 (Tue)	Bayesian Decision Theory <i>An Introduction to Decision Theory</i> , Section 6.4, pages 143–146 of Section 7.5, and Box 7.1.	
13	11/14 (Sun)	Bayesian Decision Theory <i>An Introduction to Decision Theory</i> , Sections 7.5.1 and 9.1.	Quiz #9 Problem set #12 handed out
	11/16	 Eid Al-Adha Break	
14	11/21 (Sun)	Bayesian Decision Theory <i>An Introduction to Decision Theory</i> , Section 7.5.2.	Quiz #10 Problem set #13 handed out
	11/23 (Tue)	Bayesian Decision Theory Thomas Gilovich, Robert Vallone, and Amos Tversky, "The Hot Hand in Basketball: On the Misperception of Random Sequences" (handout).	
15	11/28 (Sun)	The Normative Force of Principles of Rationality (Unit #5) Herbert Simon, "A Behavioral Model of Rational Choice" (handout).	Quiz #11 Problem set #14 handed out
	11/30 (Tue)	The Normative Force of Principles of Rationality Isaac Levi, "Rationality and Commitment" (handout).	
	TBA		Final Exam

Policies

Reasonable Accommodations

I recognize that you are a human being with occasional human problems associated with human finitude. Illness, family emergencies, job interviews, other professors, etc. . . will inevitably lead to legitimate conflicts over your time. If you expect that you will be missing class or be unable to turn in an assignment on time, please notify me (either in class or via email) *in advance* and we can agree on a reasonable accommodation. Arrangements after the fact will only be made in extraordinary, documented circumstances.

Challenging an Assignment Grade

Please recognize that I am human also: mistakes will occasionally occur when grading your assignments. Therefore, you have *one week* after an assignment is handed back to challenge its grade. To do so, you must return the assignment to me along with a clearly written explanation of your reason for challenging its grade. I will promptly and seriously consider all such requests and meet with you, if necessary, to resolve them. Assignments without a written explanation will not be considered. After one week, no challenges will be accepted, except in extraordinary, documented circumstances. Of course, if you are not satisfied with your grade, but recognize that it was not due to a fault in the grading, I encourage you to talk with me to learn how to improve on future assignments.

Students with Disabilities

In compliance with university policy and equal access laws, I am available to discuss appropriate academic accommodations that you may require as a student with a disability. Request for academic accommodations should be made during the first week of the term, except for unusual circumstances, so arrangements can be made. Students are required to register for disability verification and for determination of reasonable academic accommodations. For more information, visit

<http://www.cmu.edu/hr/eos/disability/students/index.html>

Sexual Harassment Policy

It is the policy of the university that no male or female member of the university community (i.e., students, faculty, administrators, or staff) may sexually harass any other member of the community. Sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute harassment when:

- Submission to such conduct is made or threatened to be made, either explicitly or implicitly, a term or condition of an individual's employment or education; or
- Submission to or rejection of such conduct is used or threatened to be used as the basis for academic or employment decisions affecting that individual; or
- Such conduct has the purpose or effect of substantially interfering with an individual's academic or professional performance or creating what a reasonable person would sense as an intimidating, hostile, or offensive employment, educational, or living environment.

For more information, visit

<http://www.cmu.edu/policies/documents/SexHarass.html>

A Note on Classroom Courtesy

Classes begin at 10:30AM. You are expected to be seated by that time and to remain seated until the class is dismissed. If you must leave before the class ends because of a medical appointment, or similar commitment, notify me before class begins and sit near the door. Students who leave without providing such notice and have not suddenly taken ill will be expected to drop the course and not to return.

Video Taping and Audio Recording

Your classmates and I have a reasonable expectation to not be recorded in this course. Therefore, videotaping and audio recording are prohibited without our expressed, unanimous permission.

Cell Phones, Laptops, and Other Related Technologies

Student interactions with portable technology devices can harm the dynamics of the classroom. Therefore, I expect you to silence your cell phones prior to class and to not text-message during class. *All laptops should be closed unless you have made prior arrangements with me and have demonstrated that using a laptop is necessary for your learning.*

Cheating and Plagiarism

plagiarism (plā 'jē-rīz 'ēm) *n* 1: a piece of writing that has been copied from someone else and is presented as being your own work. 2: the act of plagiarizing; taking someone's words or ideas as if they were your own.

Plagiarism is bad. Do not do it. It amounts to lying, cheating, and stealing. Anyone caught doing it can fairly assume that they will not pass this course.

It is the responsibility of each student to be aware of the university policies on academic integrity, including the policies on cheating and plagiarism. This information is available at

<http://www.cmu.edu/policies/documents/Cheating.html>

Also see the section on "University Policies" in the most recent edition of *The Word: Undergraduate Student Handbook*.

Students who cheat or plagiarize face serious sanctions at both the course level, and the university level. At the course level, faculty at Carnegie Mellon University have significant discretion to determine the sanctions that are appropriate to individual cases of cheating and plagiarism. Within the Philosophy Department, it is customary to give plagiarized assignments a failing grade and, where appropriate, to fail students for the course. Additionally, a letter is sent to the Dean of Students indicating that the student in question has submitted plagiarized material and received a course-level sanction. Plagiarism is also a violation of the community standards of Carnegie Mellon University. As such, allegations of plagiarism may be brought before a University Academic Review Board, which will determine whether a violation of community standards has taken place and level additional sanctions if appropriate. Although this body also has significant discretion over the sanctions that it levels, plagiarism can result in academic probation, suspension, and even expulsion.