

# Philosophy 321/002 Induction, Decision and Game Theory

2021-22 Winter Term 2 (Spring 2022)

Monday, Wednesday and Friday, 12:00 – 12:50, BIOL 2200

## Instructor: Chris Stephens

Office: Buchanan E-356

Office Hours: Mondays and Wednesdays, 1-2 p.m., or by appointment

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Teaching Assistant: TBD email:

**Course Description:** What makes a decision rational? In this course we will examine two different approaches to this question: decision theory and game theory. Decision theory is used to analyze the decision making of an individual under various degrees of ignorance about what factors will affect the outcomes of the agent's choices. Game theory is used to analyze decisions in which the outcomes of an agent's decision are determined in part by what other agents do.

Decision and game theory are studied and used in a wide variety of areas, including economics, statistics, business, evolutionary biology, psychology, political science, mathematics, computer science and philosophy. Although we will have occasion to discuss examples from some of these areas, the primary emphasis will be on *philosophical* issues. This means that we will focus on the conceptual foundations of decision and game theory, with special attention given to certain puzzles (*e.g.*, Newcomb's paradox and the Prisoner's Dilemma). We will also spend time thinking about the applications of these theories to various areas of philosophy, including social and ethical problems.

## Texts:

(1) **(IDT)** *An Introduction to Decision Theory*, second edition, by Martin Peterson (Cambridge University Press, 2017). Available at UBC Bookstore.

(2) **(OL)** On line readings. Links to the on line readings will be available at the course website through Canvas (<https://isit.arts.ubc.ca/canvas/>) This requires your CWLogin information)

Please let the bookstore know if they run out of copies of Peterson's book.

**Pre-requisites:** Although Phil 120 or Phil 220 is listed as a prerequisite, neither course is required. Students should, however, have some degree of mathematical sophistication. That is, you should feel comfortable with basic algebra, probability and logic. If you have taken introductory courses in mathematics, economics or computer science, that is sufficient background for this course. Please see me if you have any questions about whether you have the appropriate background.

## Course Requirements

(1) Best 10 out of 11 Group Exercises	10%
(2) 2 Problem Sets (each 5%)	10%
(3) Mid-term Exam	20%
(4) Final Exam	35%
(5) Term Paper	25%

## Marking Scale

90-100% A+	85-89% A	80-84% A-
76-79% B+	72-75% B	68-71% B-
64-67% C+	60-63% C	55-59% C-
50-54% D	0-49% F	

Each of these course requirements is discussed below.

## **Group Exercises**

Periodically I will break you up into groups of about 3-4 people and each group will complete an exercise. Each member of a given group (who is present) will receive the same grade on the assignment. The group exercises are generally NOT announced in advance. Your best 10 (out of 11) group exercises count toward your final group exercise grade. Your final group exercise grade can be affected by the performance evaluations of the other members of your group. You will have an opportunity to evaluate your fellow group members on the final exam.

## **Problem Sets**

There will be two sets of homework problems, designed to give you some additional practice at solving decision and game theory problems. Each set is worth 5% of your total course mark. Problem sets are marked down by 5% per day late.

## **In-class Exams**

Each student is required to take the mid-term and final examinations. The exams are designed to test your comprehension of the material that has been covered in class and in the readings. The exams will likely consist of a mixture of multiple choice and short answer questions. I will hand out a review sheet about a week or two before each exam.

## **Term Paper**

Each student is required to write one (double-spaced) paper approximately 2,000 - 2,200 words in length. I will pass out paper topics a few weeks into the term (about 5 weeks before the paper is due). At that time, I will also pass out information about how to write a good paper. Term papers will also be marked down by 5% per day late. Term papers are due by **Friday, April 1<sup>st</sup>**.

## **Attendance**

There is no official requirement that you attend class. However, it is difficult to do well unless you attend regularly. If you do miss class, it is your responsibility to find out what you missed. Please contact another student, the TA or me. Remember that the group exercises are not generally announced ahead of time, so if you miss class you run the risk of missing a group activity. If you miss a group activity and you do not have a University-sanctioned excuse, you will receive a "0" for that assignment. Finally, you will not be allowed to make up exams without a documented, University-sanctioned excuse.

In general, I expect students to be consistently well prepared for class by having read (and thought about) the material. These readings are not to be passively consumed - I welcome (and expect) questions and challenges in class. I also hope that students will drop by my office frequently to discuss what we're doing or just to say "hello" and let me know how the course is going. If you are unable to come to my office hours, please feel free to set up an appointment. You are also encouraged to discuss any problems you may have with the teaching of the course.

The Centre for Accessibility (<https://students.ubc.ca/about-student-services/centre-for-accessibility>) provides resources for students who need academic accommodation. Please contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and to facilitate your educational opportunities.

Finally, please note that cheating and plagiarism are serious offenses. If you have any questions about what constitutes academic misconduct, please check with me or review the UBC guidelines:

### **Plagiarism:**

Plagiarism, which is intellectual theft, occurs where an individual submits or presents the oral or written work of another person as his or her own. Scholarship quite properly rests upon examining and referring to the thoughts and writings of others. However, when another person's words (i.e. phrases, sentences, or paragraphs), ideas, or entire works are used, the author must be acknowledged in the text, in footnotes, in endnotes, or in another accepted form of academic citation. Where direct quotations are made, they must be clearly delineated (for example, within quotation marks or separately indented). Failure to provide proper attribution is plagiarism because it represents someone else's work as one's own. Plagiarism should not occur in submitted drafts or final works. A student who seeks assistance from a tutor or other scholastic aids must ensure that the work submitted is the student's own. Students are responsible for ensuring that any work submitted does not constitute plagiarism. Students who are in any doubt as to what constitutes plagiarism should consult their instructor before handing in any assignments.

UBC link about Academic misconduct:

<http://www.calendar.ubc.ca/Vancouver/index.cfm?tree=3,54,111,959>

## Schedule of Subjects, Readings and Assignments (subject to possible change).

(IDT) *An Introduction to Decision Theory* (OL) On line (<https://isit.arts.ubc.ca/canvas/>)

<u>Week</u>	<u>Dates</u>	<u>Subject</u>	<u>Reading Assignment</u>
1	Jan 10, 12, 14	Intro to Decision Theory	(IDT) ch. 1, ch. 2, p. 1-40
2	Jan 17, 19, 21	Decisions under ignorance	(IDT) ch. 3, p. 41-64. (OL) Gardiner “A Core Precautionary Principle”
3	Jan 24, 26, 28	Decision under risk; utility	(IDT) ch. 4 (4.1, 4.2, 4.3); begin (IDT) ch. 5
4	Jan 31, Feb 2, 4	Utility; interpretations of probability	(IDT) ch. 5; (IDT) ch. 6; (IDT) ch. 7
5	Feb 7, 9, 11	Bayesianism, Pragmatic arguments	(IDT) ch. 8 <b><i>Problem Set #1 due Feb 11<sup>th</sup> by 11:59 p.m. (submitted to Canvas)</i></b>
6	Feb 14, 16, 18	Puzzle Cases: Allais’ paradox; Ellsberg, St. Petersburg, Pasadena & Two-envelope paradoxes	(IDT) ch. 4 (4.4, 4.5, 4.6, 4.7, 4.8)

### ***No class Feb 21-25 (Spring Break)***

7	Feb 28, Mar 2, 4	Newcomb’s Paradox & Causal vs. Evidential Decision theory	(IDT) ch. 9 (OL) Egan “Some Counterexamples to Causal Decision Theory” <b><i>Midterm Exam Friday March 4<sup>th</sup> (in class)</i></b>
8	Mar 7, 9, 11	Psychology & Game theory Intro to game theory	(IDT), ch. 14 and begin (IDT) ch. 11
9	Mar 14, 16, 18	More intro to game theory	(IDT) ch. 11
10	Mar 21, 23, 25	Failures of Equilibrium; Prisoner's Dilemma	(IDT) ch. 12 (12.1, 12.2, 12.3, 12.4) <b><i>Problem Set #2 due by March 25<sup>th</sup> at 11:59 p.m. (submitted to Canvas)</i></b>
11	Mar 28, 30, Apr 1	Evolutionary Game Theory	(IDT) ch. 12 (12.5, 12.6) (OL) Skyrms <i>Evolution of the Social Contract</i> , ch. 1 and ch. 2 <b><i>Term Paper due Friday, April 1<sup>st</sup> by 11:59 p.m. (submitted to Canvas)</i></b>
12	Apr 4, 6, 8	Evolutionary Game theory, continued	(OL) D’Arms et. al “Game theoretic explanations of the evolution of justice” (OL) Henrich et al “In search of homo economicus: Behavioral experiments in 15 small scale societies” (OL) Skyrms “The Stag Hunt”

**Note:** At least part of April 8<sup>th</sup> class will be set aside for a final exam review – come with questions!

**Final exam:** Between and April 12<sup>th</sup> and April 27<sup>th</sup>: *Please do not take this course if your travel plans will prohibit you from taking the final exam.*