PE3101P: Decision Theory and Social Choice

Instructor: Tomi Francis

Semester 1, AY2026/27

1 Course and Instructor Information

Course name: Decision Theory and Social Choice.
Course code: PE3101P.
Lecture: Thursdays 14:00–16:00, AS1-0203.
Tutorials (weeks 4/6/8/10/12):

- TE1: Fridays 10:00–12:00, AS2-0311.
- TE2: Tuesdays 14:00–16:00, AS3-0215.

Instructor: Tomi Francis.
Email: tomi.francis@nus.edu.sg.
Office hours: Thursdays 16:00–18:00, AS7-03-12.
Office location: AS7-03-12.

Office hours are straight after the lecture, so there is no need to wait until 16:00 if you need me. If you need to meet outside them, email me and we will arrange it. My office may move later this semester; I will let you know if it does.

2 Course Overview

Decision-making is straightforward when we know exactly what will happen depending on what we choose and only one person's preferences are at issue. But very few decisions are like that. This course concerns rational decision-making when we are uncertain of the outcomes of our actions (decision theory) and when we need to reconcile differing preferences within a group of people (social choice theory). We will run through a series of classic results and topics in both fields, which are guaranteed to delight and amuse. Some of the greatest hits will include:

- Introductory probability theory
- Expected utility theory
- Dynamic decision theory and money pump arguments
- Harsanyi's aggregation theorem
- Amartya Sen's paradox of the impossibility of the Paretian liberal
- Arrow's impossibility theorem

This course will involve a bit of mathematics, but no particular prior knowledge will be assumed.

3 Course Requirements

Students are expected to read the core readings (usually one short text) per week, to attend one lecture per week, and a tutorial each fortnight starting week 4. Assessment details below.

4 Assessment

This course is assessed entirely by continuous assessment. **There is no final examination.**

Component	Weighting	Week	Date
Take-home assignment 1	20%	End of week 4	Fri 4 September 2026
In-class test 1	30%	Week 6	Thu 17 September 2026
Take-home assignment 2	20%	End of week 11	Fri 30 October 2026
In-class test 2	30%	Week 13	Thu 12 November 2026
Total	**100%**		

Both in-class tests are held in the Thursday lecture slot.

5 Course Schedule

The readings listed below are the required readings for the course. The schedule and the reading list may be adjusted as the semester goes on; any changes will be announced in class and on Canvas.

Week	Date	Topic	Core Reading
1	Thu 13 Aug	Introduction	BDRC ch. 1 (not compulsory for week 1)
2	Thu 20 Aug	Probability	BDRC chs. 2–3
3	Thu 27 Aug	Newcomb's problem	BDRC ch. 9; Elga 2020
4	Thu 3 Sep	Expected utility theory	BDRC chs. 5–6
5	Thu 10 Sep	Money pumps and dynamic choice	Gustafsson 2022, ch. 1; BDRC ch. 8
6	Thu 17 Sep	**In-class test 1**	—
Recess week: Sat 19 – Sun 27 September 2026			
7	Thu 1 Oct	Harsanyi's aggregation theorem	Gustafsson & Kowalczyk 2025
8	Thu 8 Oct	Game theory	BDRC ch. 10
9	Thu 15 Oct	Sen's liberal paradox	Sen 1970
10	Thu 22 Oct	Arrow's impossibility theorem	Cato 2010
11	Thu 29 Oct	Collective action and the rationality of voting	Barnett 2020
12	Thu 5 Nov	TBA	TBA
13	Thu 12 Nov	**In-class test 2**	—

Tutorials run fortnightly in weeks 4, 6, 8, 10 and 12.

6 Readings

The main text is freely available online:

[1] Wolfgang Schwarz. *Belief, Desire, and Rational Choice.* 2022. Open access at `https://github.com/wo/bdrc`. Abbreviated "BDRC" above.

Additional readings, in the order in which they are used:

[2] Adam Elga. "Newcomb University: A Play in One Act". In: *Analysis* 80.2 (2020), pp. 212–221.

[3] Johan E. Gustafsson. *Money-Pump Arguments.* Cambridge University Press, 2022. Open access. Chapter 1.

[4] Johan E. Gustafsson and Kacper Kowalczyk. "Harsanyi's Utilitarian Theorems without Tears". Draft of 29 January 2025. Guest essay, *utilitarianism.net.*

[5] John C. Harsanyi. "Cardinal Welfare, Individualistic Ethics, and Interpersonal Comparisons of Utility". In: *Journal of Political Economy* 63.4 (1955), pp. 309–321.

[6] Amartya Sen. "The Impossibility of a Paretian Liberal". In: *Journal of Political Economy* 78.1 (1970), pp. 152–157.

[7] Susumu Cato. "Brief proofs of Arrovian impossibility theorems". In: *Social Choice and Welfare* 35.2 (2010), pp. 267–284.

[8] Zach Barnett. "Why You Should Vote to Change the Outcome". In: *Philosophy and Public Affairs* 48.4 (2020), pp. 422–446.

[9] Yoaav Isaacs, Adam Lerner, and Jeffrey Sanford Russell. "Counting Your Chickens". In: *Australasian Journal of Philosophy* 102.3 (2024), pp. 675–692. *Optional.*