

PHIL 3800 Computability, Complexity, and Randomness
Spring, 2025
Course Description

The course will explore the notions of computation, complexity and randomness, and their significance from a philosophical point of view.

Potential Topics

Suggested readings for each topic will be posted on the course Canvas site.

- What is a computable function? What is a decision procedure? What is the Church-Turing Thesis? Can it be proven?
- Of what interest is the notion of (Turing) decidability from the point of view of the philosophy of mathematics? What is the philosophical significance of the Gödel Incompleteness Theorems? Of the Church-Turing Undecidability Theorem? Of what interest is resource-bounded computational complexity from the point of view of the philosophy of mathematics?
- What is the problem of induction? Do computational models of concept acquisition enrich our understanding of the problem of induction? How might such models be deployed to better understand psychological processes such as child language acquisition? To what extent might results from computability theory elucidate Occam's Razor?
- What is randomness? How is it related to complexity? To predictability? How can ideas from the theory of computability, such as Kolmogorov complexity or Martin-Löf randomness, be used to explicate a philosophically interesting notion of randomness?
- Of what interest is computability theory from the point of view of the philosophy of science more generally? For example, how, if at all, do results about the complexity of computing equilibria in games or in markets bear on issues concerning the nature of explanation in the social sciences?

Course Requirements and Grades

Assignments will consist of a mix of problem sets, short papers, and class presentations. Grades will be based on performance on these exercises, as well as regular engagement with class discussion.