

PHIL 304 – Philosophy of Science, Fall 2020, Bilkent University

Instructor: Dr. István Aranyosi

Aim of the course: to familiarize students with the topics and debates in contemporary general philosophy of science.

Topics covered: the demarcation problem, theories of explanation, laws of nature, the problem of induction, verification, falsification, underdetermination of theory by data, scientific realism and antirealism, Kuhn, Feyerabend, sociology of scientific knowledge.

Course materials: All texts will be provided electronically by the instructor on Moodle.

Assessment: The course will be taught online in the form of lectures (1 hour/week) and seminars (2 hours/week). Students will be assessed along the following components:

- a. **Weekly summary of the texts and questions (20%).** Students are asked to read the two texts assigned each week and summarize them in one page per text. After each summary, students are asked to raise one or more questions about the text. These questions can be clarificatory or expressing objections and criticism. One document containing all of the above should be submitted on Moodle.
- b. **Text presentation (20%).** Each text will be assigned to a student who will present it during the 2-hour seminar sessions.
- c. **Participation (includes attendance) at seminars (10%).** Students are required to raise questions and put forward comments during the seminars.
- d. **Term paper (25%).** Students are required to write a 2000-3000-word long paper on a topic covered in the course. This paper should offer an overview of the topic and the student's own view about the topic or the debates within that topic.
- e. **Final exam (25%).** Students will be given a final exam consisting of a number of questions from all the material covered during the semester. This exam is take-home and will be uploaded on Moodle.

Weekly schedule

Week 1: Introduction

Week 2: Science, non-science, pseudoscience : the demarcation problem

Karl Popper, *The Logic of Scientific Discovery*, chapter 1 (1935)

Larry Laudan, "The demise of the demarcation problem" (1983)

Week 3: Scientific explanation 1: The D-N model and its problems

Carl Hempel, "Explanation in science and history" (1962)

Bas van Fraassen, "The pragmatics of explanation" (1977)

Week 4: Scientific explanation 2: Causal explanation and unification

Philip Kitcher, "Explanatory unification and the causal structure of the world" (1989)

Wesley Salmon, "Scientific explanation: causation and unification" (1990)

Week 5: Laws of nature

John Earman, *A Primer on Determinism*, excerpt: 81 – 90 (1986)

John Carroll, "The Humean tradition" (1990)

Week 6: Induction, probability, statistics, Bayesianism

James Ladyman, *Understanding Philosophy of Science*, chapter 2 (2002)

Wesley Salmon, "Bayes's Theorem and the History of Science" (1970)

Week 7: Verification, falsification, underdetermination 1

Karl Popper, *The Logic of Scientific Discovery*, chapter 4 (1935)

W.V.O. Quine, "Two dogmas of empiricism" (1953)

Week 8: Verification, falsification, underdetermination 2

Nelson Goodman, *Fact, Forecast, and Fiction*, chapter 3 (1983)

L. Laudan and J. Leplin, "Empirical equivalence and underdetermination" (1991)

Week 9: Scientific Realism 1: standard realism

Stathis Psillos, *Scientific Realism: How Science Tracks Truth*, chapter 4 (1999)

Stathis Psillos, *Scientific Realism: How Science Tracks Truth*, chapter 5 (1999)

Week 10: Scientific Realism 2: entity-realism and structural realism

Ian Hacking, "Experimentation and Scientific Realism" (1982)

John Worall, "Structural Realism: the best of both worlds?" (1989)

Week 11: Antirealism

Bas van Fraassen, *The Scientific Image*, chapter 2 (1980)

Gary Gutting, "Scientific Realism versus Constructive Empiricism: a dialogue" (1982)

Week 12: Historicity: Kuhn on paradigms and revolutions

Thomas Kuhn, *The Structure of Scientific Revolutions*, chapter 2 and 3

Thomas Kuhn, *The Structure of Scientific Revolutions*, chapters 5 and 6

Week 13: Anarchism: Feyerabend against method

Paul K. Feyerabend, *Against Method*, Introduction, chapter 1, chapter 2 (1975)

Paul K. Feyerabend, *Against Method*, chapter 3, chapter 4 (1975)

Week 14: The Strong Programme of the Sociology of Scientific Knowledge

David Bloor, *Knowledge and Social Imagery*, excerpt: 3–23. (1991)

Bruno Latour and Steve Woolgar, *Laboratory Life*, chapter 6 (1979)