

# Introduction to Philosophy of Physics

John Dougherty

WiSe 2024/2025

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Meeting:	Tuesdays, 14:00–16:00 (c.t.) Ludwigstr. 31 / 028
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## Overview

**Description** Philosophy of physics is a branch of philosophy concerned with the physical sciences. Some of the questions it investigates are questions about the physical sciences themselves: what counts as a good physical theory or a good explanation of a physical phenomenon? What is the precise relationship between physical theories and evidence? Which parts of a given theory—say, quantum mechanics—could be changed without “breaking” the theory? Other questions concern traditional philosophical matters in the light of particular physical theories: what is the world like, assuming that Newtonian mechanics is a good theory? What can we know about the unobservable things described by physics, like space, time, and the fundamental constituents of matter?

In this course, we will investigate some of these questions in the context of Newtonian mechanics. We will begin by studying pre-Newtonian theories of matter and motion, in order to understand Newton’s context. We then study the justification and interpretation of Newton’s theory—in particular, the problems of space, body, and force that occupied eighteenth and nineteenth century interpreters of the theory. The last part of the course addresses how these problems change in the light of relativity theory.

**Objectives** By the end of the course, you should be able to (i) state one or more traditional philosophical problems concerning motion and (ii) explain why they are problems. Exhibiting ability (i) means giving a statement, in academic writing and in your own words, of an argument about motion. Exhibiting ability (ii) means explaining why the argument poses a problem: why someone might want to believe the premises but not the conclusion.

## Materials

All materials for this course will be available on LSF.

## Assessment

The evaluation for this course will be by means of a term paper submitted at the end of the semester. If you would like to submit a term paper, you must register through LSF during the registration period (20.01.–31.01.) and submit it to me by email by the term paper deadline (28.03.2025). Please note that extensions of this deadline are not up to me; if you need an extension, please contact Fabian Widerna ([f.widerna@lmu.de](mailto:f.widerna@lmu.de)) at the Prüfungsamt für Geistes- und Sozialwissenschaften (PAGS).

Your paper should be on a topic related to those we discuss in the course. I will distribute a list of suggested questions and grading criteria before the registration period. You may write your paper on topic not on that list; if you do, then I recommend speaking to me before writing the paper, so that I can advise on the topic and scope of your planned alternative. The term paper should be 3000 words for BA students and 6000 words for MA students. In either case, it should be written in 12pt font, with 1.5 spacing, 3cm margins on the left and right, and a standard academic typeface (Computer Modern, Palatino, Times New Roman, Calibri, etc.).

## Resources

Questions about the administration of philosophy teaching at LMU should be directed to Thomas Wyrwich ([thomas.wyrwich@lrz.uni-muenchen.de](mailto:thomas.wyrwich@lrz.uni-muenchen.de)). The Erasmus coordinator for philosophy at LMU is Peter Adamson (<https://www.philosophie.uni-muenchen.de/studium/auslandstudium/index.html>). The list of women’s representatives (Frauenbeauftragte) for the Philosophy Faculty can be found on the Faculty’s webpage (<https://www.philosophie.uni-muenchen.de/fakultaet/frauenbeauftragte/index.html>). Issues regarding the economic, social, and cultural aspects of student life—including studying with a

child or studying with a disability—are the responsibility of the Munich Student Union (<https://www.studentenwerk-muenchen.de>).

## Schedule and readings

**15.10** Overview

**22.10** Aristotle, excerpts from *Physics*

**29.10** Averroes, excerpt from *Questions in Physics*

**05.11** Oresme, excerpt from *On the Book of the Heavens and the World of Aristotle*; Bradwardine, excerpt from *Treatise on Proportions*

**12.11** Galileo, excerpt from *Dialogue Concerning the Two Chief World Systems*

**19.11** Descartes, excerpts from *Principles of Philosophy*

**26.11** Newton, excerpts from *On the Gravity and Equilibrium of Fluids* and *Mathematical Principles of Natural Philosophy*

**\*03.12** Newton, excerpts from *Mathematical Principles of Natural Philosophy*

**10.12** Excerpts from the Leibniz–Caroline–Clarke correspondence

**17.12** Kant, excerpts from *Critique of Pure Reason*

**07.01** Du Châtelet, excerpts from *Foundations of Physics*

**14.01** Du Châtelet, excerpts from *Foundations of Physics*

**16.01** Helmholtz, “On the facts underlying geometry”

**21.01** Berkeley, excerpt from *On Motion*; Mach, excerpt from *The Science of Mechanics*

**28.01** Herz, excerpts from *The Principles of Mechanics*

**04.02** Einstein, excerpt from *Relativity: The Special and the General Theory*