

# Philosophy of Physics

## Space, Time, and Spacetime

نیم سال دوم تحصیلی ۹۸-۹۹

مدرس: نرگس بهمن پور

زمان: شنبه ها ۱۰ الی ۱۳

This module will explore the philosophical discussions and ideas surrounding space, time, and spacetime. Specifically, we shall present Newton's substantivalist view of space versus Leibniz's relationist approach which argues against the reality of space.

This will set the stage for an introduction to Einstein's Special and General Theories of relativity. Our aim is to understand these remarkable theories with as little use of mathematics as possible.

We shall then delve into discussions on the philosophy of time: Is time real? Does what we mean by time simply constitute what we refer to as change? Is change real? What are the consequences of special relativity for the philosophy of time?

Ultimately, we shall take a look at time's arrow and the second law of thermodynamics: why is there an asymmetry in the direction of time, and how does it relate to the concept of entropy?

### Primary Resources:

- *"Time and Space"*, Barry Dainton
- *"The Unreality of Time"*, McTaggart, *Mind*, New Series, Vol. 17, No. 68 (Oct., 1908), pp. 457-474.
- *"Physics and Chance: Philosophical Issues in the Foundations of Statistical Mechanics"*, Lawrence Sklar.

### Assessment Methods

- Class Presentation (4 marks)  
Present the topics taught in class from the point of view of a different author.  
A potential list of textbooks will be provided in due course.
- Two essays, due every four weeks, 2000 words each (3 marks per essay)  
Suggested topics will be provided, or the student may suggest their own topic, subject to approval
- Final Exam (10 marks)

Exact dates and deadlines shall be agreed upon in class