

PHIL 411: Philosophy of Time & Space

Details:	Spring 2017	Instructor:	Robert Smithson
Time:	WF 11:45-1	Email:	robert.smithson@duke.edu
Room:	Carr 240	Office:	206 West Duke Building
Website:	https://sakai.duke.edu/portal/site/phil411.sp17	Office Hours:	F 1-3 and by appt.

Course Description

Space and time are two of the most familiar aspects of our everyday experience. We experience the passage of time as we wait at the bus stop. We experience movement through space as the bus travels down the road. But there are many ways in which philosophical reflection and scientific theorizing challenge our ordinary conception of space and time. In this class, we will consider questions such as: is time travel possible? Does time really “pass”? How is the present different from the past and the future? How is space different from time? Is space a “container” in which objects live, or is it merely a system of relations between objects?

This course will follow a four-part trajectory. In unit 1, we will clarify our “naive” conception of space and time (as reflected in ordinary spatial and temporal experience as well as in conceptual intuitions associated with spatial and temporal linguistic expressions). In unit 2 and 3, we will consider this everyday conception of space and time is challenged by (i) philosophical reflection and (ii) physical theorizing, respectively. In unit 4, we will consider whether there may be limits to the extent to which philosophical and physical theorizing can undermine our pre-reflective conception of space and time.

Course Goals

1. To provide students with a conceptual framework for investigating questions in the philosophy of space and time.
2. To examine the ways in which philosophical theorizing and physical theorizing require us (or—perhaps—do not require us) to modify the naive conception of space and time we form on the basis of our everyday sensory experiences.

Background for this course

This course is designed to be accessible both to philosophy majors and to students majoring in STEM fields. This course is entirely self-contained; the requisite philosophical concepts, mathematics, and physics will be explained in class. While only a limited amount of mathematics will be required for the course, any students with a phobia of math should expect to find the mathematical portions of the course difficult. Similarly, students with limited philosophical background should expect to find the philosophical techniques employed throughout the course challenging. Please contact the instructor for more detailed information about what to expect from the course.

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Because students taking PHIL 411 often have different levels of familiarity with philosophy, mathematics, and physics, it is useful for the instructor to have a sense of students' background and interests prior to the start of the class. To this end, students will be sent an (anonymous) form asking about past courses taken, topics of special interest, etc. The instructor will likely modify the syllabus and lectures in response to this feedback.

Course Texts

-Tim Maudlin (2011). *Quantum Nonlocality and Relativity, 3rd edition*. Wiley-Blackwell. ISBN: 1444331272.

-Tim Maudlin (2012). *Philosophy of Physics: Space & Time*. Princeton University Press. ISBN: 0691165718.

-All course readings will be provided on the course website.

Honor Code

In this class, the Honor Code is taken very seriously and all infractions will be reported to the Honor Council. In particular, papers previously turned in for other classes are not eligible to be turned in for this class.

Grading

Three short papers (for units 1-3) (4-6 pages each): 40%

Exercises/writing assignments (roughly biweekly, 1 pages each): 20%

Final: 30%

Participation/Unannounced quizzes: 10%

The participation grade takes into account both attendance and discussion in class. Class attendance is mandatory. If you have an excused absence (such as a medical absence), please bring me a note or send me an email.

Papers

Papers should be emailed to the instructor by the beginning of class period on the assigned due date; the due dates will be announced in class. Students will lose a third of a letter grade for each day a paper is late. To facilitate grading, include only your PID number (and not your name) at the top of the document. For helpful advice on writing philosophy papers, see Jim Pryor's introduction: www.jimpryor.net/teaching/guidelines/writing.html.

Technology

In order to promote classroom discussion, no laptops, tablets, phones, etc. are permitted during class except by instructor permission.

Course Schedule

The professor reserves the right to make changes to the syllabus, depending on the progress of the discussion in the class. If there are changes, I will make note of them in class and will send out an email about the changes.

Date	Topic
	Unit 1: Naive conceptions of space and time
F 1/13	Molyneux problem, syllabus, course trajectory <i>Reading:</i> None. <i>Optional background:</i> Marjolein Degenaar & Gert-Jan Lokhorst (2014). Molyneux's Problem.
W 1/18	Naive conceptions of space and time. <i>Reading:</i> Sakai handout. <i>Optional background:</i> On temporal experience: Barry Dainton (2002). <i>Stream of Consciousness: Unity and Continuity in Conscious Experience</i> , chs. 1, 3, 5. On spatial experience: Brad Thompson (2010). The Spatial Content of Experience. On perception: William Fish (2010). <i>Philosophy of Perception: A Contemporary Introduction</i> .
F 1/20	Geometric structure, nature vs. structure, spatial experience. <i>Reading:</i> David Chalmers (2014). Three Puzzles for Spatial Experience (intro, sections 2-3). Sakai handout.
W 1/25	Spatial experience, functionalism vs. primitivism. <i>Reading:</i> David Chalmers (2014). Three Puzzles for Spatial Experience (sections 1, 4-5). Sakai handout. <i>Optional background:</i> Appendix on the categorical phenomenology of left and right.
F 1/27	Spatial experience continued. <i>Reading:</i> none.
W 2/1	Temporal experience. <i>Reading:</i> Barry Dainton (2010). <i>Time and Space</i> . Ch. 7. Ian Phillips (2014). Breaking the silence: motion silencing and experience of change. Sakai handout.
F 2/03	Temporal experience, continued. <i>Reading:</i> Ian Phillips (2014). The Temporal Structure of Experience. Sakai handout. <i>Optional background:</i> Geoffrey Lee (2014). Temporal Experience and the Temporal Structure of Experience.
	Unit 2: Challenges from metaphysics
W 2/08	A-theory <i>Reading:</i> Ned Markosian (1993). How Fast Does Time Pass? Barry Dainton (2010). <i>Time and Space</i> . Ch. 2. Sakai handout. <i>Optional background:</i> Michael Tooley (2010) Farewell to McTaggart's Argument?

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- F 2/10 B-theory
Reading: Barry Dainton (2010). *Time and Space*. Ch. 3. (two excerpts)
Sakai handout.
Laurie Paul (2010) Temporal Experience.
- W 2/15 Class canceled.
- F 2/17 A-theory/B-theory, continued.
Reading: None.
- W 2/22 Presentism/eternalism.
Reading: Dean Zimmerman (2007). The Privileged Present.
Ted Sider (2000). *Four Dimensionalism* (excerpts).
Sakai handout.
- F 2/24 Time travel, single timeline
Reading: David Lewis (1976). The Paradoxes of Time Travel. Sakai handout
- W 3/01 Time travel: multiple timelines.
Reading: Peter van Inwagen (2010). Changing the Past. Sakai handout.
Sakai handout.
- F 3/03 Absolutism vs. relationism, geometric structure, historical background
Reading: Tim Maudlin (2012). *Space and Time*. Chs. 1-2. (excerpts)
Sakai handout.
- W 3/08 Arguments for absolutism, arguments for relationism.
Reading: Tim Maudlin (2012). *Space and Time*. Ch. 2.
Sakai handout.
Optional background: Barry Dainton (2010). Chs. 10-11. (excerpts)
- F 3/10 Galilean spacetime,
Reading: Tim Maudlin (2012). *Space and Time*. Ch. 3.
Sakai handout.
Optional background: Barry Dainton (2010). Chs. 12. (excerpts)
- W 3/22 Newtonian relationism, New-Newtonian relationism.
Reading: Barry Dainton (2012). Chs. 12. (excerpts)
Sakai handout.
- Unit 3: Challenges from physics**
- F 3/24 Minkowski geometry, spacetime in special relativity, the Lorentz Invariant Interval
Reading: Sakai handout.
Tim Maudlin (2012) *Space and Time*. Ch. 4. (excerpts)
Optional background: Edward Taylor and John Wheeler (1992). *Spacetime Physics*. (excerpts).
- W 3/29 Geometric laws in special relativity, the twins paradox.
Reading: Sakai handout.
Tim Maudlin (2012) *Space and Time*. Ch. 4. (excerpts)
Optional background: Edward Taylor and John Wheeler (1992). *Spacetime Physics*. (excerpts).

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- F 3/31 Constructing Lorentz coordinates, time dilation, Lorentz contraction
Reading: Sakai handout.
Tim Maudlin (2012) *Space and Time*. Ch. 4. (excerpts)
Optional background: Edward Taylor and John Wheeler (1992).
Spacetime Physics. (excerpts).
- W 4/05 The “constancy of the speed of light,” deriving the Lorentz equations,
metaphysical implications of special relativity: presentism/eternalism,
A-theory/B-theory, temporal passage, and time travel
Reading: Sakai handout.
Optional background: Katherine Hawley (2009). *Metaphysics and
Relativity*.
Bradford Skow (2009). *Relativity and the Moving Spotlight*.
Tim Maudlin (2007). *On the Passing of Time*. (excerpt)
- F 4/07 Locality, polarization, entangled states, Bell’s Theorem, Aspect’s
Experiment
Reading: Sakai handout.
Tim Maudlin (2011) *Quantum Nonlocality and Relativity*. Ch. 1.
- W 4/12 Superluminal mass/energy transfer, tachyons.
Reading: Sakai handout.
Tim Maudlin (2011) *Quantum Nonlocality and Relativity*. Ch. 3.
- F 4/14 Superluminal signals, superluminal causation.
Reading: Sakai handout.
Tim Maudlin (2011) *Quantum Nonlocality and Relativity*. Chs. 4-5.
- W 4/19 Quantum formalism, wave collapse, reconciling QM with SR
Reading: Sakai handout.
Tim Maudlin (2011) *Quantum Nonlocality and Relativity*. Chs. 7.
- F 4/21 Riemannian spacetime, gravity, General Relativity, tensions between QM
and GR.
Reading: Sakai handout. Barry Dainton (2010). Chs. 13. (excerpts)
Tim Maudlin (2012) *Time & Space*. Ch. 6.
Tim Maudlin (2011) *Quantum Nonlocality and Relativity*. Ch. 8.
- W 4/26 Spatiotemporal anti-realism.
Reading: Alyssa Ney (2012). *The Status of our Ordinary Three
Dimensions in a Quantum Universe*.
- Unit 4: A return to naivety?**
- F 4/28 Idealism about space, idealism about time.
Reading: none.
Optional background: Mike Pelczar (forthcoming). *What Is Time?*
John Foster (2008). *A World for Us: The Case for Phenomenalistic
Idealism*. (excerpts)
- T 5/2 9am-12pm **EXAM**