

**Syllabus: Philosophy 306**  
**Philosophy of Science**  
TR 11:00-12:15, Alison 314  
Fall 2019

**Instructor:** Prof. Noel Swanson (nswanson@udel.edu, 24 Kent Way, Office 102)

**Office Hours:** T 3:30-5, W 1-3, or by appointment

**Description:** This course follows the history of 20th century philosophy of science from the rise and fall of logical positivism, to recent debates on structural realism. On the way, we'll explore several major issues in epistemology and metaphysics, including inductive skepticism, the relationship between theory and evidence, scientific revolutions, the nature of laws and causation, scientific explanation, and the critique of analytic philosophy of science coming from history, sociology, and feminist theory. Peter Godfrey-Smith's excellent introductory text *Theory and Reality* will provide the main historical arc for the course. Every other week, we'll focus on a related contemporary debate, reading papers by leading thinkers in philosophy of physics, philosophy biology, and general philosophy of science.

**Format:** Two weekly 75-minute lectures combined with in-class discussion.

**Goals:** As one of the hallmark examples of rational inquiry, science is an important case study for philosophical issues in epistemology and metaphysics. In this course we'll try to understand the scope and limits of scientific knowledge. We'll examine in detail how scientific theories are devised, constructed, and tested and seek to ascertain how scientific investigation and metaphysical inquiry are related (if at all). Realists view science as a broadly unified, progressive enterprise, capable of uncovering deep truths about the nature of unobservable reality. One of our primary goals will be to determine if this is an accurate picture. In particular, we want to figure out how scientific realism is possible in light of skeptical problems of induction.

**Readings:** The primary text is:

- *Theory and Reality*, Godfrey-Smith

This will be supplemented by additional articles posted on the course website (limited to about 30 pages per week). Optional readings are marked on the schedule with an asterisk.

For students interested in additional background reading, the Stanford Encyclopedia of Philosophy and the "Pittsburgh Bible," *Introduction to the Philosophy of Science*, edited by Salmon and Earman, both contain good review articles on many of the topics covered in this course.

**Assignments:** One short paper (1,500 words), one long paper (3,000 words), and a final exam.

**Grading:** Short paper 25%, long paper 35%, final exam 30%, discussion participation 10% (Late papers will be docked 1/3 letter grade per day late.)

**Prerequisites:** While there are no formal prerequisites, this is an upper level philosophy course. Ideally, students will have taken a prior philosophy course or a university-level science course.

**Schedule:**

Week 1: Science and Philosophy  
(8/27-30)

*Theory and Reality*, Ch. 1  
van Fraassen, *The Scientific Image* (excerpts)

Week 2: Logical Positivism  
(9/3-6)

*Theory and Reality*, Ch. 2  
\*Carnap, "The Elimination of Metaphysics"

Week 3: Contemporary Issue — Reduction and Emergence  
(9/9-13)

Sober, "The Multiple Realizability Argument Against Reductionism"  
\*Batterman, "Reduction and Multiple Realizability"  
\*Wilson, "Mixed-Level Explanation"

Week 4: Hume's Problem  
(9/17-21)

*Theory and Reality*, Ch. 3 + Lecture Notes  
\*Goodman, "The New Riddle of Induction"  
\**Theory and Reality*, Ch. 4

- Week 5: Contemporary Issue — Confirmation Theory  
(9/23-27)
- Theory and Reality*, Ch. 14  
 Harman, “Inference to Best Explanation”  
 \*Mayo, “Learning from Error”  
 \*Kelly, “Ockham’s Razor, Truth, and Information”
- Week 6: Scientific Revolutions  
(9/30-10/4)
- Theory and Reality*, Ch. 5-6  
 Kuhn, *The Structure of Scientific Revolutions* (excerpts)  
 \**Theory and Reality*, Ch. 7
- Week 7: Contemporary Issue — Skeptical Meta-Induction (**Short Paper Due 10/7**)  
(10/7-10)
- Roush, “Optimism About the Pessimistic Induction”  
 \*Laudan, “A Confutation of Convergent Realism”
- Week 8: The Sociological and Feminist Critique  
(10/14-18)
- Theory and Reality*, Ch. 8-9  
 \*Longino, *Science as Social Knowledge* (excerpts)
- Week 9: Contemporary Issue — Social Epistemology  
(10/21-25)
- Weisberg and Muldoon, “Epistemic Landscapes and the Division of Cognitive Labor”  
 \*Zollman, “Network Epistemology”
- Week 10: Scientific Realism  
(10/28-11/1)
- Theory and Reality*, Ch. 12  
 Worrall, “Structural Realism: The Best of Both Worlds?”  
 \*van Fraassen, *The Scientific Image* (excerpts)

Week 11-12: Contemporary Issue — The Quantum Measurement Problem  
(11/4-15)

Ney, *The Wavefunction*, Introduction

\*Wallace, “The Modern Measurement Problem”

\*Ruetsche, “Interpreting Quantum Theories

Week 13: Scientific Explanation  
(11/18-22)

*Theory and Reality*, Ch. 13

Maudlin, “Causation, Counterfactuals, and the Third Factor”

\*Lewis, “Causal Explanation”

\*Kitcher, “Explanatory Unification and the Causal Structure of the World”

**(11/25-29) Thanksgiving Break**

Week 14: Wrapping Up (**Long Paper Due 12/2**)  
(12/2-6)