

PHIL 481 Einstein's Philosophy  
of Science  
TTh 2:00-3:15  
DeBartolo 328

Fall 1998

Prof. Don Howard  
361 Decio/346 O'Shaughnessy  
Tel: 631-7547/-5015  
Don.A.Howard.43@nd.edu  
Office Hours: TTh 10:00-11:00

### ***Required Texts:***

Albert Einstein, *Ideas and Opinions* (New York: Crown, 1954).

Paul Arthur Schilpp, ed., *Albert Einstein: Philosopher-Scientist*, 3rd ed., The Library of Living Philosophers, vol. 7 (LaSalle, Illinois: Open Court, 1969).

Additional readings may be photocopied from master copies in the Reilly Center office (346 O'Shaughnessy) and the philosophy department mail room (338 O'Shaughnessy).

***Course Requirements:*** There will be a mid-term and a final examination, each an in-class, essay examination worth 25% of your final grade. A term paper (minimum 12 pages) will be worth 40% of your final grade. The remaining 10% of your grade will be based on class participation.

***One-minute Papers:*** At the end of every class session, we will stop a minute or two early, so as to give you the opportunity to write "one-minute papers." These will be ungraded, but required of every student at the end of every class. Normally no more than two paragraphs long, these one-minute papers must contain answers to two questions: (1) What was the most important issue addressed in today's class? (2) What issue remains most unclear in your mind at the end of today's class?

### ***Schedule:***

#### ***Date: Topic:***

#### ***Readings:***

Aug. 25 Introduction to the Course

Aug. 27 Philosophy of Science at the Turn  
of the Century: Neo-Kantianism

Helmholtz, "The Facts of Perception"

Sep. 1

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Von Rintelen, "Neo-Kantianism in General," "The Marburg School: Hermann Cohen and Paul Natorp"; Perry, "Critical Idealism in Germany. Cohen. Natorp"

Sep. 3 No Class

Sep. 8 Philosophy of Science at the Turn  
of the Century: Mach and  
Positivism

Mach, "The Economy of Science," "The Relations of Mechanics to Physiology," "Introductory Remarks: Antimetaphysical," "Influence of the Preceding Investigations on Our Conception of Physics"

Sep. 10 Philosophy of Science at the Turn  
of the Century: The Reaction to  
Positivism

Boltzmann, "On the Question of the Objective Existence of Processes in Inanimate Nature," "On Statistical Mechanics," "Model," "Characterization of the Method Chosen"

Sep. 15	Philosophy of Science at the Turn of the Century: The Mach-Planck Debate	Planck, "The Unity of the Physical World-Picture"; Mach, "The Guiding Principles of My Scientific Theory of Knowledge and Its Reception by My Contemporaries"; Planck, "On Mach's Theory of Physical Knowledge: A Reply"
Sep. 17	Philosophy of Science at the Turn of the Century: Conventionalism	Poincaré, "Author's Preface," "On the Nature of Axioms," "Experiment and Geometry," "General Conclusions on Part III," "Hypotheses in Physics," "Introduction," "The Measure of Time," "Is Science Artificial?"
Sep. 22	"	Duhem, "Physical Theory and Experiment"
Sep. 24	Einstein's Intellectual Career—An Overview	Einstein, "Autobiographical Notes," Schilpp, pp. 1-94
Sep. 29	"	
Oct. 1	"	
Oct. 6	Truth, Categoricity, and <i>Eindeutigkeit</i>	Schlick, "The Nature of Truth in Modern Logic"; Howard, "Einstein and Eindeutigkeit."
Oct. 8	"	
Oct. 13	Constructive Theories and Principle Theories	Giedymin, "The Physics of Principles"; Einstein, "What is the Theory of Relativity?" <i>Ideas and Opinions</i> , pp. 227-232
Oct. 15	<b>Mid-term Examination</b>	
<b>Fall Break, 19-23 October</b>		
Oct. 27	Realism and Instrumentalism	Holton, "Mach, Einstein, and the Search for Reality"; Fine, "Einstein's Realism"; Howard, "Was Einstein Really a Realist?"
Oct. 29	"	Frank, "Einstein, Mach, and Logical Positivism," Schilpp, pp. 269-286; Bridgman, "Einstein's Theories and the Operational Point of View," Schilpp, pp. 333-354; Margenau, "Einstein's Conception of Reality," Schilpp, pp. 243-268; Wenzl, "Einstein's Theory of Relativity Viewed from the Standpoint of Critical Realism, and Its Significance for Philosophy," Schilpp, pp. 581-606
Nov. 3	The Einstein-Schlick Relationship	Schlick, "The Philosophical Significance of the Relativity Principle," "Relations to Philosophy," "The Nature of Knowledge"
Nov. 5	"	

Nov. 10	Conventionalism and Neo-Kantianism	Schlick, "Critical or Empiricist Interpretation of Modern Physics?"; "The Theory of Relativity in Philosophy"; Reichenbach, "The Present State of the Discussion of Relativity," "Cognition as Coördination," "Two Meanings of 'A Priori' and Kant's Implicit Presupposition," "The Refutation of Kant's Presupposition by the Theory of Relativity," "The Answer to the Critical Question by the Method of Logical Analysis"
Nov. 12	"	Einstein, "Geometry and Experience," <i>Ideas and Opinions</i> , pp. 232-246; Einstein, Review of Émile Meyerson, <i>La Dédution Relativiste</i> ; Reichenbach, "The Philosophical Significance of the Theory of Relativity," Schilpp, pp. 287-312; Howard, "Einstein and Duhem"
Nov. 17	Einstein and the Vienna Circle	Howard, "Einstein, Kant, and the Origins of Logical Empiricism"; Reichenbach, "Space"; Schlick, "Are Natural Laws Conventions?"; Lenzen, "Einstein's Theory of Knowledge," Schilpp, pp. 355-384; Northrop, "Einstein's Conception of Science," Schilpp, pp. 385-408
Nov. 19	"	Einstein, "On the Method of Theoretical Physics," <i>Ideas and Opinions</i> , pp. 270-276, "Physics and Reality," <i>Ideas and Opinions</i> , pp. 290-323, "The Fundamentals of Theoretical Physics," <i>Ideas and Opinions</i> , pp. 323-335, "Remarks on Bertrand Russell's Theory of Knowledge"
Nov. 24	"	Holton, "What, precisely, is 'thinking'?" Einstein's Answer"
Nov. 26	<b><i>Thanksgiving Holiday</i></b>	
Dec. 1	Einstein as a Critic of the Quantum Theory	Einstein, Podolsky, and Rosen, "Can Quantum Mechanical Description of Physical Reality Be Considered Complete?"; Bohr, "Can Quantum Mechanical Description of Physical Reality Be Considered Complete?"; Bohr, "Discussion with Einstein on Epistemological Problems in Atomic Physics," Schilpp, pp. 199-202; Fine, "Einstein's Critique of Quantum Theory: The Roots and Significance of EPR,"; Howard, "Einstein on Locality and Separability," "'Nicht sein kann was nicht sein darf,' or the Prehistory of EPR, 1909-1935: Einstein's Early Worries about the Quantum Mechanics of Composite Systems"
Dec. 3	"	
Dec. 8		
<b><i>Exam Week, 14-18 December</i></b>		
Dec. 16	<b><i>Final Examination 10:30am</i></b>	
Dec. 18	<b><i>Term Paper Due</i></b>	