INTRODUCTION TO HISTORY AND PHILOSOPHY OF SCIENCE

HPS 1653 / PHIL 1610

MON/WED 1:00 - 1:50

105 LAWRENCE HALL

INSTRUCTOR

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TEACHING ASSISTANT

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Recitation Times: Mon, Wed 2-2:50; Tues 1:1:50

Course Description

This course will provide a broad survey of a number of central schools, figures, and topics in general philosophy of science. We will consider in detail the views of the logical positivists as well as their critics, Thomas Kuhn, Karl Popper, Carl Hempel, the sociologists of science, and feminist philosophers of science. We will consider answers to such questions as: How does science differ from other forms of human knowledge? How are scientific claims supported by evidence? In what sense does science provide us with explanations or enhance our understanding of the world? Do scientific theories aim to describe the real structure of the world, or simply one that is useful? Do the unobservable entities postulated in scientific theories really exist? How could we know? We shall combine a reading of some classic texts along with more recent work.

Prerequisites

This course is designed specifically for undergraduate students in history and philosophy of science, but those in other disciplines, especially the sciences, will also find much of interest. If you have any questions or concerns regarding the content of the course, please ask as soon as possible.

Course Website

http://sai2247.wix.com/introps (password: introps)

Texts

Required

1. All readings will be available online (https://courseweb.pitt.edu)

Suggested Resources

1. Salmon *et al*. (1999), *Introduction to Philosophy of Science* (**S below**)
2. Machamer and Silberstein (2003), *The Blackwell Guide to the Philosophy of Science* (**MS below**)
3. Godfrey-Smith (2003), *Theory and Reality* (**GS below**)
4. Curd et al (2013) *Philosophy of Science: The Central Issues* (**Many of the readings in here**)
5. Klemke et al (1998), *Introductory Readings in Philosophy of Science*
6. Giere (1988), *Explaining Science*
7. The *Stanford Encyclopedia of Philosophy* (http://plato.stanford.edu/)

. There are also class-specific background readings listed below

Assessment and Policies

Course Requirements

1. Two Short Papers (15%, 15%)	30%
2. Blog Post Entry	10%
3. In-Class Midterm Exam	20%
4. Attendance and Discussion	15%
5. Take-home final exam	25%

1. Short Papers (**Due: Sept 23, Nov 23**)**:** Each student is required to write two short papers. Each of these two papers will be worth 15% of the final grade. These short papers should be between two and three double-spaced pages (800-1000 words). These papers are do *at the start* of class (hard copies are strongly preferred to electronic). I will provide paper topics one week before the due date of each paper (these will be posted on the website). The papers should be argumentative in style and concisely written.

2. Blog Post Entry (**Due: Nov. 9**)**:** Each student is required to write one blog post entry. On Oct 26 we will not meet in the classroom but instead in the front foyer of the Hillman Library. The Special Collections department at the library has agreed to show us archival materials from their Archives of Scientific Philosophy (houses the papers and notes of many of the leading figures we will consider in this course). After this class, each student is required to submit via email a blog post of ~500 words in length, preferably also including a picture taken during the archival trip of the archival material. Excellent blog posts will be sent to archivists at Hillman library and posted on their website. Further details of this assignment will be provided during the Oct 26 class. This assignment will be worth 10% of the final grade.

3. In-Class Midterm Exam: There will be an in-class midterm exam on **Oct. 12**. It will cover class material (that is, material from readings, lectures, and discussion sections with Siska) up to and including the class of Oct 7th. The exam will be worth 20% of your final grade.

4. Discussion: Everyone is expected to take part in discussion sections on a regular basis. This means that you should regularly attend these sections and ask and answer questions. Please come prepared having done all the relevant readings before the start of each section. Your TA will explain further details about these sections in your first meeting.

5. Take-Home Final Exam: A take-home final exam will be handed out on the last day of class, **Dec. 9**. It will include material from throughout the entire term (that is, material from readings, lectures, and discussion sections with Siska). It will be due **Dec. 16**.

Assessment

Grading Rubric: All grades will be given a number.; final grade through UPitt's system will be a letter grade. The following is a grading rubric for overall achievement in the course.

A+ (**4.00, 95+**)**/A** (**4.00, 87-94**)**/A-** (**3.75, 82-86**): Represents achievement that is outstanding relative to the level necessary to meet course requirements.
B+ (**3.25, 77-81**)**/ B** (**3.00, 72-76**)**/ B-** (**2.75, 68-71**): Represents achievement that is well above the level necessary to meet course requirements.
C+ (**2.25, 64-67**)**/ C** (**2.00, 60-63**)**/ C-** (**1.75, 55-59**): Represents achievement that meets the course requirements in every respect.
D (**1.00, 50-54**): Represents achievement that is worthy of credit even though it fails to meet fully the course requirements.
F (**0, 0-49**): Represents failure that is not worthy of credit even if some course requirements were met.

University Academic Policies

Academic Integrity: Students in this course will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity (http://www.cfo.pitt.edu/policies/policy/02/02-03-02.html). Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University

Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

Disability Services: If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS) (http://www.studentaffairs.pitt.edu/drswelcome), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Accessibility: Blackboard is ADA Compliant and has fully implemented the final accessibility standards for electronic and information technology covered by Section 508 of the Rehabilitation Act Amendments of 1998. Please note that, due to the flexibility provided in this product, it is possible for some material to inadvertently fall outside of these guidelines.

Copyright Notice: These materials may be protected by copyright. United States copyright law, 17 USC section 101, et seq., in addition to University policy and procedures, prohibit unauthorized duplication or retransmission of course materials. See Library of Congress Copyright Office and the University Copyright Policy.

Statement on Classroom Recording: To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

Schedule

Day	Topic	Required Readings	Background Readings
Aug. 31	***Introduction:*** *What is Philosophy of Science?*	. Syllabus . Logistics	. (GS), chapt 1

Day	Topic	Required Readings	Background Readings
Sept 2	***Intro to Logical Positivism:*** *Why logical positivism?*	. Hahn et al. (1929) Vienna Circle Manifesto . Hegel (1823) "Concept of the History of Philosophy" (SKIM) . Mach (1897) *Analysis of Sensations*, chat 1 (SKIM) . Einstein (1921) "Geometry and Experience" (SKIM) . Carnap (1966) "The Value of Laws" (SKIM)	. (GS), chapt 2 . (MS), chapt 1 . http://plato.stanford.edu/entries/logical-empiricism/ . Galison (1990) "Aufbau/Bauhaus"
Sept. 7		***Labor Day - No Class***	
Sept. 9	***Central Ideas of Logical Positivism***	. Schlick (1932/3) "Positivism and Realism" . Ayer (1936) *Language, Truth, and Logic,* Preface and Chapt 1 (SKIM) . Reichenbach (1938) *Experience and Prediction*, Preface and Chapt 1(SKIM)	
Sept. 14	***Problems for Logical Positivism:*** *The Fall of Logical Positivism*	. Quine (1953) "Two Dogmas of Empiricism" . Carnap (response)	. (GS), chapt 2 . (MS) chapt 4
Sept. 16	***Topic 1: The Problem of Demarcation:*** *How does science differ from other forms of human knowledge?*	. Popper (1963) "Science: Conjectures and Refutations"	. (GS) chapt 4 . http://plato.stanford.edu/entries/pseudo-science/
Sept. 21		. Ruse (1982) "Creation-Science is Not Science"	
Sept. 23	**FIRST PAPER DUE** ***Topic 2: Induction and Confirmation:*** *How are scientific claims supported by evidence?* *The old problems of induction*	. Lipton (1991) "Induction"	. (GS), chapt 3 . (S) chapt 2 . (MS) chapt 2 . http://plato.stanford.edu/entries/induction-problem/

Day	Topic	Required Readings	Background Readings
Sept. 28	*The new problem of induction*	. Goodman (1983) "The New Riddle of Induction"	
Sept. 30	***Popper: Science, Confirmation and Falsificationism:*** *Intro to Karl Popper's philosophy*	. Popper (1959) "The Problem of Induction"	. (GS) chapt 4 . http://plato.stanford.edu/entries/popper/
Oct. 5	***Problems for Popper:*** *Objections to Popper's Philosophical Views*	. Salmon (1981) "Rational Prediction"	
Oct. 7	***Philosophy of Science at UPitt*** ***+Midterm Discussion***	. CPS (2000), "Celebrating 40 years"	
Oct. 12	**MIDTERM EXAM**		
Oct. 14	***Fall Break***		
Oct. 19	***History and the Growth of Scientific Knowledge:*** *Thomas Kuhn on Normal and Revolutionary Science*	. Kuhn (1962) "The Nature and Necessity of Scientific Revolutions" . Kuhn (1970) "Logic of Discovery or Psychology of Research?" (SKIM)	. (GS) chapt 5, 6 . (S) chapt 4 . http://plato.stanford.edu/entries/thomas-kuhn/
Oct. 21	***History and the Growth of Scientific Knowledge:*** *Kuhn and Relativism*	. Kuhn (1977) "Objectivity, Value Judgment, and Theory Choice"	
Oct. 26	***Trip to Hillman Library Special Collections***		
Oct. 28	***The Challenge from Sociology:*** *A quick look at the Strong Program*	. Bloor (1976) "The Strong Programme in the Sociology of Knowledge" . Shapin (1982) "History of Science and its Sociological Reconstructions" (SKIM) . Shapin (1984) "Pump and Circumstance" (SKIM)	. (GS) chapt 8 . http://plato.stanford.edu/entries/scientific-knowledge-social/

Day	Topic	Required Readings	Background Readings
Nov. 2	***Values and Feminist Epistemology:*** *Varieties of feminist criticism of science*	. Longino (1990) "Values and Objectivity"	. (GS) chapt 9 . (MS) chapt 15 . http://plato.stanford.edu/entries/feminist-science/
Nov. 4		. Okruhlik (1994) "Gender and the Biological Sciences"	. http://plato.stanford.edu/entries/feminism-epistemology/
Nov. 9	**BLOG POST DUE** ***Topic 3: Explanation:*** *In what sense does science provide us with explanation or understanding of the world?* *The D-N model*	. Hempel (1962) "Two Basic Types of Scientific Explanation" . Carnap (1966) "The Value of Laws: Explanation and Prediction" (SKIM) . Hempel (1965) "The Thesis of Structural Identity" (SKIM)	. (GS) chapt 13 . (S) chapt 1 . (MS) chapt 3 . http://plato.stanford.edu/entries/scientific-explanation/
Nov. 11	*I-S Model*	. Hempel (1965) "Inductive-Statistical Explanation"	
Nov. 16	*Unification Model*	. Kitcher (1981) "Explanatory Unification"	
Nov. 18	***Class Canceled***		
Nov. 23	**FINAL PAPER DUE** ***Topic 4: Realism:*** *Do scientific theories aim to describe the real structure of the world? Do the entities they postulate really exist?* *Maxwell's realism*	. Maxwell (1962) "The Ontological Status of Theoretical Entities"	. (GS) chapt 12 . (S) chapt 3 . http://plato.stanford.edu/entries/scientific-realism/
Nov. 25	***Thanksgiving - No Class***		
Nov. 30	*Constructive Empiricism*	. van Fraassen (1980) "Arguments Concerning Scientific Realism"	

Day	Topic	Required Readings	Background Readings
Dec. 2	*Entity Realism*	. Hacking (1982) "Experimentation and Scientific Realism"	
Dec. 7	***Topic 5: Reductionism:*** *What does it mean for one theory to be reduced by another?* *Pro-reductionism*	. Nagel (1974) "Issues in the Logic of Reductive Explanations"	. (MS) Chapt 5 . http://plato.stanford.edu/entries/scientific-reduction/
Dec. 9	**TAKE-HOME EXAM POSTED** *Anti-reductionism*	. Kitcher (1984) "1953 and All That: A Tale of Two Sciences"	