

PHIL 460: Introduction to the Philosophy of Science
University of Washington
Fall term, 2016

Course Time: Mon/Wed/Fri 2-3:20PM

Course Location: Savery Hall 130

Instructor: Benjamin Feintzeig

Email: bfeintze@uw.edu

Office Hours: Wed 3:30-4:30pm, Fri 10:30-11:30am, and by appointment

Office Location: Savery Hall M397, Tel.: (206) 543-5094

Texts:

Philosophy of Science: The Central Issues, ed. Martin Curd and J.A. Cover. New York: W.W. Norton & Company

All other readings will be made available on the course website.

Course Description:

Science is supposed to be the human knowledge-gaining enterprise par excellence. But what distinguishes science from other human endeavors? And what, if anything, makes the methods used by scientists more objective or rational? This course will investigate questions about the nature of scientific knowledge through an introductory survey to contemporary philosophy of science. Topics covered will include empirical meaningfulness, scientific confirmation, scientific explanation, theory change, the engagement of science with social issues and values, and scientific realism. Throughout, we'll pay particular attention to examples from the history of science (including the physical, biological, and social sciences) and the context in which theories develop.

Course Outcomes: By the end of the quarter, students will be able to:

- A. Read and analyze contemporary literature in the philosophy of science.
- B. Think critically about the nature of scientific knowledge and its role in society.
- C. Defend theses concerning the nature of science with clear arguments and evidence.

Student Assignments:

1. *Attendance & Participation:* Course attendance is mandatory. Students will be graded on their participation, which can be demonstrated through contributions to class discussions, posting in the Canvas discussion forum, or attending office hours.
2. *Readings:* Students are expected to complete all required readings prior to the the day listed in the schedule below. The content of readings and lectures are intended to be complementary; they will overlap substantially but not completely. Students are responsible for both contents. Please bring copies of the relevant readings to class each day. Readings in the textbook will be marked (C&C); all other readings will be available on the course website.
3. *Reading Responses:* Students are required to write short responses (approximately 2 sentences) to each of the readings, and submit them electronically via Canvas. The purpose of these responses is to ensure that students complete the reading while engaging and thinking critically about its content; they will be graded for completion only. Each submission should contain a response of approximately 2 sentences for each reading: a one sentence (approximately) summary of the thesis of the reading, and a one sentence (approximately) question or objection concerning the argument or position advanced in the reading. **Students will submit their responses by noon before each class meeting**—this will allow the instructor some time to review the responses so we can use questions for discussion in class.
4. *Historical Examples:* Students are required to post to the discussion board twice throughout the quarter, according to the following specifications.
 - a. **(due by Wed, 11/23)** Each student must create a new thread in the discussion forum in which they
 - (i) summarize an example from the history of science that either appears in one of the readings or bears on topics in the course,
 - (ii) explain how the historical example illustrates a philosophical thesis, or serves as a counterexample to a view, etc., **and**
 - (iii) provide at least 2 scholarly references for further information.
 - b. **(due by Fri, 12/9)** Each student must respond to at least one existing thread concerning a historical example by finding a different philosophical issue from the course—that is, different from the philosophical issue discussed in the initial post—on which they think this same example bears and explaining how the historical example bears.
5. *Papers:* Students will write 3 short essays (5-6 pages; 1800 words maximum) with tentative due dates **Fri 10/28, Mon 11/21, and Wed 12/13**. More information about the papers will be available on Canvas, including possible paper topics. **Students are required to have the instructor approve their paper topics either in person or by email**. Students will have the option to revise either (and at most one) of the first two papers, with the revision due **Wed 12/13**. The new grade on the revised version will be averaged with the original grade for the paper.

6. *Group Presentations:* Students will prepare presentations (15-30 min) in groups of 3-5 introducing the class to one of the following major topics for the course. Each presentation will be given on the first day of that unit on the syllabus, listed below. **Students must sign up for a group by Mon, 10/3.** More information about the presentations can be found on Canvas.

Explanation (Mon 10/10)
 Reduction (10/21)
 Realism (10/31)
 Values (11/16)
 Representation (11/28)

Assignment Policies:

Late Assignments: Late assignments will not be accepted after the due date except in cases of documented emergency or prior arrangement with the instructor, i.e. If you don't speak with me beforehand, no extension will be granted.

Academic Dishonesty and Plagiarism: Assignments with plagiarism will result in the full consequences available, including a grade of zero for the assignment with no possibility of revision and referral for disciplinary action at the university level. If you do not understand the rules for avoiding plagiarism, it is your responsibility to speak with the instructor or someone else for clarification.

Grading:

Paper 1	25%
Paper 2	25%
Paper 3	25%
Revision (optional)	averaged with original grade
Presentation	5%
Historical Examples	10%
Reading Responses	5%
Participation	5%
TOTAL	100%

Schedule (tentative and subject to revision):

Date	Topic	Required Readings	Optional Readings
Wed 9/28, Week 1	Motivation		
Fri 9/30, Week 1	Logical Positivism I: Introduction	Schlick, M. "Positivism and Realism"	
Mon 10/3, Week 2	Logical Positivism II: Empiricism and Meaning	Hempel, C. "Empiricist Criteria of Cognitive Significance: Problems and Changes"	Ayer, A.J. "Verification and Philosophy"
Wed 10/5, Week 2	Logical Positivism III: Confirmation	a. Hempel, C. "Criteria of Confirmation and Acceptability" (C&C, p. 445-459) b. Goodman, N. <i>Fact, Fiction, and Forecast</i> "The New Riddle of Induction"	
Fri 10/7 Week 2	Logical Positivism IV: Testing	a. Popper, K. "Science: Conjectures and Refutations" (C&C, p. 3-10) b. Franklin, L. R. "Exploratory Experiments"	
Mon 10/10, Week 3	Explanation I: The Deductive Nomological Model	Salmon, W. <i>Four Decades of Scientific Explanation</i> , "Introduction", "The Fountainhead: The Deductive-Nomological Model", "Famous Counterexamples to the Deductive-Nomological Model"	Hempel, C. & Oppenheim, P. "Studies in the Logic of Explanation"

Date	Topic	Required Readings	Optional Readings
Wed 10/12, Week 3	Explanation II: Probabilistic Explanation	Railton, P. “A Deductive-Nomological Model of Probabilistic Explanation” (C&C, p. 746-765) b. Salmon, W. <i>Four Decades of Scientific Explanation</i> , “Railton’s Nomothetic/Mechanistic Account”	Railton, P. “Probability, Explanation, and information”
Fri 10/14, Week 3	Explanation III: Causal Explanation	a. Salmon, W. “Comets, Pollen, and Dreams: Some Reflections on Scientific Explanation b. Salmon, W. “Why Ask, “Why?”?: An Inquiry Concerning Scientific Explanation”	
Mon 10/17 Week 4	Explanation IV: Unification	Kitcher, P. “Explanatory Unification”	Strevens, M. “The Causal and Unification Approaches to Explanation Unified—Causally”
Wed 10/19, Week 4	Explanation V: Pragmatics	a. Van Fraassen “The Pragmatic Theory of Explanation” b. Lloyd, E. & Anderson, C. “Empiricism, Objectivity, and Explanation”	
Fri 10/21, Week 4	Reduction I: Deduction and Bridge Laws	Nagel, E. “Issues in the Logic of Reductive Explanations” (C&C, p. 905-921)	
Mon 10/24, Week 5	Reduction II: Limiting Relations	Nickles, T. “Two Concepts of Intertheoretic Reduction” (C&C, p. 950-970)	Batterman, R. <i>The Devil in the Details</i> “Introduction”, “Asymptotic Reasoning”

Date	Topic	Required Readings	Optional Readings
Wed 10/26, Week 5	Reduction III: Anti-reductionism	Kitcher, P. "1953 and All That: A Tale of Two Sciences" (C&C, p. 971-1003)	Waters, C. K. "Why the Antireductionist Consensus Won't Survive the Case of Classical Mendelian Genetics"
Fri 10/28, Week 5	Interlude: Against Positivism	a. Duhem, P. "Physical Theory and Experiment", sections 1-3 (C&C, p. 257-266) b. Quine, W.V. "Two Dogmas of Empiricism", sections 5-6 (C&C, p. 292-299)	
Mon 10/31, Week 6	Realism I: Introduction	Maxwell, G. "The Ontological Status of Theoretical Entities" (C&C, p. 1052-1063)	
Wed 11/2 Week 6	Realism II: Underdetermination	Van Fraassen, B. "To Save The Phenomena"	
Fri 11/4, Week 6	Class Cancelled		
Mon 11/7, Week 7	Realism III: Theoretical Structure	Sklar, L. "Saving the Noumena"	Boyd, R. "Realism, Underdetermination, and a Causal Theory of Evidence"
Wed 11/9, Week 7	Realism IV: Lessons from History	Laudan, L. "A Confutation of Convergent Realism" (C&C, p. 1114-1135)	Stanford, K. "Realism, Pessimism, and Underdetermination"
Fri 11/11, Week 7	Veteran's Day: No Class		

Date	Topic	Required Readings	Optional Readings
Mon 11/14, Week 8	Realism V: Quietism	a. Fine, A. “The Natural Ontological Attitude” (C&C, p. 1186-1208) b. Stein, H. “Yes, but...Some Skeptical Remarks on Realism and Anti-Realism”	
Wed 11/16, Week 8	Values I: Introduction	a. Kuhn, T. “The Nature of Normal Science”, “Normal Science as Puzzle-Solving” b. Kuhn, T. “The Nature and Necessity of Scientific Revolutions” (C&C, p. 86-101)	Darden, L. “Reasoning in Scientific Change”
Fri 11/18, Week 8	Values II: External Influences	Oreskes, N. & Conway, E. <i>Merchants of Doubt</i> , “Introduction”, “Doubt is Our Product”	Film: Kenner, R. <i>Merchants of Doubt</i> (Location & Time TBD)
Mon 11/21, Week 9	Values III: Objectivity	Longino, H. “Values and Objectivity” (C&C, p. 170-191)	Mayo, D. “Towards a More Objective Understanding of the Evidence of Carcinogenic Risk”
Wed 11/23, Week 9	Values IV: Gender	Okruhlik, K. “Gender and the Biological Sciences” (C&C, p. 192-208)	Potter, E. <i>Feminism and Philosophy of Science</i> , “Naturalized Feminist Empiricism”
Fri 11/25, Week 9	Thanksgiving		
Mon 11/28, Week 10	Representation I: Introduction	Van Fraassen, <i>Scientific Representation</i> “The Problem of Coordination”	Van Fraassen, B. <i>Scientific Representation</i> “Measurement as Representation”

Date	Topic	Required Readings	Optional Readings
Wed 11/30, Week 10	Representation II: Models	a. Hesse, M. <i>Models and Analogies in Science</i> , “The Function of Models” b. Suppes, P. “Models of Data”	Morrison, M. and Morgan, M. “Models as Mediating Instruments”
Fri 12/2, Week 10	Representation III: Theories	Halvorson, H. “Scientific Theories” (Section 5 optional)	
Mon 12/5, Week 11	Representation IV: Interpretation and Possibility	Ruetsche, L. <i>Interpreting Quantum Theories</i> , “Exegesis Saves: Interpreting Physical Theories” (Section 1.6 optional)	
Wed 12/7, Week 11	Naturalism I: Methodology	Maddy, P. <i>Second Philosophy</i> , “Introduction”, “Descartes’ first philosophy” “What’s left to do?” “Second philosophy of science”	
Fri 12/9, Week 11	Naturalism II: The Historical Record	Chang, H. <i>Inventing Temperature</i> “Introduction”, “Measurement, Justification, and Scientific Progress” “Complementary Science”	

Information for Students:

COURSES, GRADING, ACADEMIC CONDUCT

Plagiarism: Plagiarism is defined as the use of creations, ideas or words of publicly available work without formally acknowledging the author or source through appropriate use of quotation marks, references, and the like. Plagiarizing is presenting someone else's work as one's own original work or thought. This constitutes plagiarism whether it is intentional or unintentional. The University of Washington takes plagiarism very seriously. Plagiarism may lead to disciplinary action by the University against the student who submitted the work. Any student who is uncertain whether his or her use of the work of others constitutes plagiarism should consult the course instructor for guidance before formally submitting the course work involved. (Sources: UW Graduate School Style Manual; UW Bothell Catalog; UW Student Conduct Code)

Incompletes: An incomplete is given only when the student has been in attendance and has done satisfactory work until within two weeks of the end of the quarter and has furnished proof satisfactory to the instructor that the work cannot be completed because of illness or other circumstances beyond the student's control. (Source: UW General Catalog Online, "Student Guide/Grading")

Grade Appeal Procedure: A student who believes he or she has been improperly graded must first discuss the matter with the instructor. If the student is not satisfied with the instructor's explanation, the student may submit a written appeal to the chair of the Department of Philosophy with a copy of the appeal also sent to the instructor. The chair consults with the instructor to ensure that the evaluation of the student's performance has not been arbitrary or capricious. Should the chair believe the instructor's conduct to be arbitrary or capricious and the instructor declines to revise the grade, the chair, with the approval of the voting members of his or her faculty, shall appoint an appropriate member, or members, of the faculty of the Department of Philosophy to evaluate the performance of the student and assign a grade. The Dean and Provost should be informed of this action. Once a student submits a written appeal, this document and all subsequent actions on this appeal are recorded in written form for deposit in a School file. (Source: UW General Catalog Online, "Student Guide/Grading")

Concerns About a Course, an Instructor, or a Teaching Assistant: If you have any concerns about a Philosophy course or your instructor, please see the instructor about these concerns as soon as possible. If you are not comfortable talking with the instructor or not satisfied with the response that you receive, you may contact the chair of the program offering the course (names available from the Department of Philosophy, 361 Savery Hall).

If you have any concerns about a teaching assistant, please see the teaching assistant about these concerns as soon as possible. If you are not comfortable talking with the teaching assistant or not satisfied with the response that you receive, you may contact the instructor in charge of the course. If you are still not satisfied with the response that you receive, you may contact the chair of the program offering the course (names available from the Department of Philosophy, 361 Savery Hall), or the Graduate School at G-1 Communications Building (543-5900).

For your reference, these procedures are posted on a Philosophy bulletin board outside the Department of Philosophy main office on the 3rd floor of Savery Hall.

POLICIES, RULES, RESOURCES

Equal Opportunity: The University of Washington reaffirms its policy of equal opportunity regardless of race, color, creed, religion, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam-era veteran in accordance with University of Washington policy and applicable federal and state statutes and regulations.

Disability Accommodation: The University of Washington is committed to providing access, equal opportunity and reasonable accommodation in its services, programs, activities, education and employment for individuals with disabilities. For information or to request disability accommodation contact: Disabled Students Services (Seattle campus) at (206) 543-8924/V, (206) 543-8925/TTY, (206) 616-8379/Fax, or e-mail at uwdss@u.washington.edu; Bothell Student Affairs at (425) 352-5000/V; (425) 352- 5303/TTY, (425) 352-5335/Fax, or e-mail at uwbothel@u.washington.edu; Tacoma Student Services at (253) 552-4000/V, (253) 552-4413/ TTY, (253) 552-4414/Fax.

Sexual Harassment: Sexual harassment is defined as the use of one's authority or power, either explicitly or implicitly, to coerce another into unwanted sexual relations or to punish another for his or her refusal, or as the creation by a member of the University community of an intimidating, hostile, or offensive working or educational environment through verbal or physical conduct of a sexual nature.

If you believe that you are being harassed, seek help—the earlier the better. You may speak with your instructor, your teaching assistant, the undergraduate advisor (363 Savery Hall), graduate program assistant (366 Savery Hall), or the chair of the Philosophy Department (364 Savery Hall). In addition, you should be aware that the University has designated special people to help you. They are: University Ombudsman and Ombudsman for Sexual Harassment (for complaints involving faculty members and teaching assistants) Susan Neff, 301 Student Union (HUB), 543-6028; and the University Complaint Investigation and Resolution Office, 616-2028. (Sources: UW Graduate School, CIDR, Office of the President)

Office of Scholarly Integrity: The Office of Scholarly Integrity is housed in the Office of the Vice-Provost. The Office of Scholarly Integrity assumes responsibility for investigating and resolving allegations of scientific and scholarly misconduct by faculty, students, and staff of the University of Washington. The Office of Scholarly Integrity coordinates, in consultation and cooperation with the Schools and Colleges, inquiries and investigations into allegations of scientific and scholarly misconduct. The Office of Scholarly Integrity is responsible for compliance with reporting requirements established by various Federal and other funding agencies in matters of scientific or scholarly misconduct. The Office of Scholarly Integrity maintains all records resulting from inquiries and investigations of such allegations. University rules (Handbook, Vol. II, Section 25-51, Executive Order #61) define scientific and scholarly misconduct to include the following forms of inappropriate activities: intentional misrepresentation of credentials; falsification of data; plagiarism; abuse of confidentiality; deliberate violation of regulations applicable to research. Students can report cases of scientific or scholarly misconduct either to the Office of Scholarly Integrity, to their faculty adviser, or the department chair. The student should report such problems to whomever he or she feels most comfortable. (Sources: UW web page (<http://www.grad.washington.edu/OSI/osi.htm>); minutes of Grad School Executive Staff and Division Heads meeting, 7/23/98)

UW SafeCampus: Preventing violence is everyone's responsibility. If you're concerned, tell someone.

- Always call 911 if you or others may be in danger.
- Call 206-685-SAFE (7233) to report non-urgent threats of violence and for referrals to UW counseling and/or safety resources. TTY or VP callers, please call through your preferred relay service.
- Don't walk alone. Campus safety guards can walk with you on campus after dark. Call Husky NightWalk 206-685-WALK (9255).
- Stay connected in an emergency with UW Alert. Register your mobile number to receive instant notifications of campus emergencies via text and voice messaging. Sign up online at www.washington.edu/alert.

For more information visit the SafeCampus website at www.washington.edu/safecamp