

Philosophy of Science

PHL 345:001, MWF 11:00 -11:50, ROBERTS 312

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Texts: M. Curd J. ,A. Cover, and C. Pincock (eds.), *Philosophy of Science* (POS)

A. Rosenberg, *Philosophy of Science* (PS)

A collection of articles & notes will be on e-reserve (ER) in our library:

The latter consists of selected readings from Godfrey-Smith, Mayo, Salmon, Sober and possibly some others papers on philosophy of science. If my following page numbers don't match with those of your texts, then always follow the paper/chapter titles of the books/ER.

NOTICE: I will be away from Montana till 21 Jan, 2013 for presenting papers in several Indian universities and international conferences. I will be back to teach on 23 Jan. Professor Sara Waller has kindly agreed to teach this course on 14 and 16 Jan. She will talk about deductive and inductive reasoning.

The description of the course: Working scientists are not necessarily reflective about assumptions and methodology involved in their own research. Philosophy of science is primarily concerned with some features of scientific methodology and often forces us to be reflective about these methodologies by asking some simple-looking questions. This course is all about those questions/issues and how philosophers have handled them. We will cover some central issues in philosophy of science like “explanation”, “confirmation” “problems of scientific methodology”, and “the realism/antirealism debate.”

Syllabus and readings:

Introduction: There will be an initial discussion of scientific methods and reasoning. Dr. Sara Waller and later myself will talk about it. YOUR FIRST PAPER IS DUE ON 22 JAN.

1. Explanation & problems with different account of explanation:

- (i) Basic ideas behind explanation.
- (ii) “Scientific explanation”: Salmon (ER& PS: chapter 3)
- (iii) “Explanation, causation and the laws” (PS: chapter 5)
- (iv) “Scientific explanation and its discontents” (PS: chapter 5)

SECOND PAPER DUE

2. Confirmation and testing of theories and their problems:

(i) Basic ideas behind confirmation (Class discussions,; see POS, pp. 515-517. See especially also chapters 10 & 11 of PS)

- (ii) “Science: Conjectures and Refutations.” Popper (POS, pp.3-10)
- (iii) “Logic of Discovery or Psychology of Research.” Kuhn (POS, pp.11-19)
- (iv) “Objectivity, Value-Judgment, and Theory Choice” Kuhn (POS, pp.95-110)
- (v) “Ducks, Rabbits, and Normal Sciences.” Mayo (ER)
- (vi) “Severe Tests, and Methodological Underdetermination.” Mayo (ER)
- (vii) The paradoxes of confirmation (POS, pp.515-517, & Godfrey-Smith, ER)
- (viii) Bayesian confirmation theory (POS, pp.515-517& pp. 597-646)
- (ix) Popper, Severity, and Bayesian confirmation theory:

“Acceptance, Evidence, and Severity.” Bandyopadhyay & Brittan (My website: prasantabandyopadhyay.com)

THIRD PAPER DUE.

3. Varieties of issues/ problems of scientific methodology:

- (i) Basic issues confronting scientific methodology (See chapters 10 & 11 of PS)
- (ii) “Objectivity, Value-Judgment, and Theory Choice” Kuhn (POS, pp.95-110)
- (iii) “Values and Objectivity.” Longino (POS, pp.144-164)
- (iv) “Two Dogmas of Empiricism.” Quine (POS, pp.250-270)
- (v) “The Duhem-Quine Thesis” Bandyopadhyay & Brittan (my website: prasantabandyopadhyay.com)

4. Special sciences and their methodological issues:

- (i) Some of the issues of special sciences (PS: chapter 6)
- (ii) “Evidential Constraints: Pragmatic Objectivism in Archaeology (ER).” Wylie
- (iii) “Astrobiology as an Emerging Science: What Does it Tell Philosophers.” Bandyopadhyay, et. al; (my website: prasantabandyopadhyay.com)
- (iv) “Special Sciences (or: The Disunity of Science as a Working Hypothesis): POS: pp. 954-969. [If time permits.]

FOURTH PAPER DUE.

5. The realism/antirealism debate:

- (i) Basic issues surrounding the debate.
- (ii) “Arguments concerning scientific realism.” Van Fraassen (POS, pp.1060-1081)
- (iii) “Experimentation and Scientific Realism.” Hacking (POS, pp.1140-1155)
- (iv) “Epistemology for Empiricists.” Sober (ER)

FINAL PAPER DUE (LAST DAY OF CLASS)

Course Requirements

Ist paper (5), 2nd paper (10), 3rd paper (15), Fourth paper (15), Final paper (30) & Class attendance & participation (25)

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Philosophy of Science

Spring 2013

Warming-Up First Paper Assignment

Write a one-page paper discussing “What is philosophy of science?” (Hints: You could connect it to some of the sciences (hard or soft sciences you have studied or you have been thinking about of them for some time.) You could use your text-book (PS: chapters 1&2) and anthology for understanding the issues confronting philosophy of science to get some ideas. However, I really like to know what you think about some of these issues. The paper carries 10 points. This typed paper is due on 22 January (even though there is no class on that day and must be dropped in my mailbox at Wilson Hall 2-155). No excuse is good enough not to turn in the paper in time. Please don’t use fonts less than 11. For the rest use your judgment.

Second Paper Assignment

Write a two page paper on “Scientific Explanation” focusing on all the following questions. Your paper will be due after the completion of the section 1 called “Explanation and Problems with Different Accounts of Explanation”. Be sure to address the following questions. Questions 2 and 3 are most important. However, I would like to know whether you have understood our discussion on “Explanation” by giving more weight to 2 at this point. This paper carries 10 points.

1. Choose and discuss any of the theories of explanation we have discussed in the class.
2. Choose any example from science (soft or hard or something you have studied or are studying presently or are interested in it) to explain whether the example you have chosen satisfies the theory of explanation you have advocated.
3. Analyze whether the account you have discussed is to be able to explain the phenomenon (e.g., you have dropped a ball from a certain height and you have found that it is presently lying on the ground) in question.

Third Paper Assignment

Write a two page paper on “The Concept of Severity of a test” focusing on all the following questions. Your paper will be due after the completion of the section 2 called “Confirmation and Testing of Theories”. One primary source for your assignment should be the “Acceptance, Evidence, and Severity” paper located at my website. Your paper will be judged by its clarity, organizational ability and originality. (Responses to all the questions should be brief consisting of one or two paragraphs except your response to 3. Our paper should only provide you with an idea of how to construct those examples referred to in 3. You have to come up with your own examples. Please keep in mind that 3 is perhaps the most important part of the paper.) The paper carries 15 points. Here are the questions.

1. Discuss the concept of severity of a test.
2. What is a Bayesian account of severity?
3. Provide your own examples to address 2.
4. Do you have any comment/suggestion/criticism about 2?