PHIL 4951: Philosophy of Science

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Course Description

Our everyday picture of the universe gives substantial pride of place to the sciences. Science is taken to have a unique grasp on truth and empirical success. In this class, we will explore central issues in the philosophy of science. Does science track truth, and if so, how? How do scientific theories change over time? What are laws of nature? What are the roles of ethical values in the scientific enterprise? We’ll examine these questions and others from the beginning of the twentieth century, through the revolution (pun intended) caused by Kuhn’s work, and onward to contemporary players in current debates over realism and explanation. The course will highly value in-class discussion; the main product will be a high-quality research paper.

Course Goals

After this course, students will be able to:

- Identify the key players and central questions that have constituted the philosophy of science in the twentieth century,
- Evaluate and reconstruct the positions of central figures, including Popper, Kuhn, Laudan, and van Fraassen,
- Discuss and evaluate those arguments with their fellow students,
- Construct clear, reasoned arguments of their own, and present those arguments in well-structured papers.

Essential Information

- Class: Monday and Wednesday, 3:00PM–4:20PM
- Office Hours: Every Monday and Wednesday, from 12:00PM–2:30PM, as well as by appointment
- Final Exam: Friday, December 12, 3:00PM–5:00PM

Required Readings

All of the readings for this course are primary sources. One book needs to be purchased, as we will read it in full: Thomas Kuhn’s The Structure of Scientific Revolu-
Any edition will do; we'll only be reading the main text, which hasn't changed in the last few reprintings. The rest of the readings will be distributed electronically via the website for this course. The course website can be found by visiting http://www.charlespence.net/courses/ and following the link for our class.

The syllabus may well be updated over the course of the semester – such changes will be announced over e-mail, and the updated documents will all be found at the course website. Make sure to check the syllabus when preparing to do a reading: I may have provided you with a PDF on the website that contains more than you are required to read, with excerpts noted in the syllabus.

**Assignments and Grading**

Grade breakdown:

- Discussion participation: 15%
- Paper outline: 15%
- Peer review comments: 10%
- Final paper grade: 30%
- Final exam: 30%

Conversion to letter grades is as follows. Examination grades may be curved, depending upon student performance. These curves will only result in the raising of student grades, never lowering. Fractions of a point are rounded to the nearest integer using Excel. Given a dispute, Excel's math wins.

- A: 90–100
- B: 80–89
- C: 70–79
- D: 60–69
- F: 0–59

The primary product from this course will be a single seminar paper. We will construct this paper in stages, beginning with a short outline due around the middle of the semester, and progressing through a peer-review draft editing session to the paper's submission at the end of the term. The hope is to produce high-quality papers, suitable for submission to an undergraduate journal (or, for the graduate students, a professional journal) or conference if you're inclined to do so. Some paper topics will be discussed over the course of the semester, but it will ultimately be your responsibility to select a topic in line with whatever issue in the course you find the most exciting. (More information on the paper process will be forthcoming during the semester, in separate documents.)

Grading for graduate students will be on the same basis as undergraduates, excepting an expectation of longer and more sophisticated seminar papers.

Paper deadlines are:

- Outline of paper due: 10/8
- Drafts due to your peer reviewer: 11/5
• Peer review comments due to your colleagues: 11/17
• Final draft due: 12/3 (possibly negotiable as late as 12/12)

Given the size of the course, I’m hoping to foster a hybrid of a lecture and a seminar format. I’ll start each day by lecturing for hopefully not more than two-thirds of the class period, opening things up to discussions when I’m finished. These discussions will be where you really learn what’s going on in the material – philosophy is always best as a conversation. So while I’ll be doing everything I can to get you the nuts and bolts of the material, everyone is expected to study the reading carefully and come prepared to discuss it.

Finally, we will have a short-essay final exam, designed to let you work through some of the issues other than those that you write about in your paper. I will distribute the questions for this exam in advance, and encourage you to work together to study in groups.

Each student will be allowed to miss two class periods with no reduction in grade. Each absence after that will remove points from the seminar participation grade. Late work will be penalized by one letter grade (= 10 points) for each day that it is late. Absences will be evaluated in accordance with LSU policy, and I will do my best to be accommodating to good reasons for being out of class.

Interruptions or disruptions to class or to the ability of other students to learn will not be tolerated, and will be referred to Student Advocacy & Accountability. All of your work in this course falls under your academic obligations in the LSU Code of Student Conduct. Cheating or plagiarism will be detected, and it is my policy to refer every instance to SAA.

If you require accommodations from the Office of Disability Services, please get in touch with that office early in the semester and get that information to me as soon as possible. Also, the final exam schedule is set now – if you have three or more exams in one day, you can already find this out, and should get one rescheduled through the Dean of Students office.

Other Resources

I highly recommend you stop by my office hours if you’re interested in talking through some of this material. I’m always happy to chat about this stuff, and will gladly help in any way that I can!

If you’re particularly interested in the philosophy of science, or have some trouble making your way through some of these readings, I can also recommend a variety of introductory textbooks that can offer further material. These are not required readings, and I wouldn’t expect any of you to purchase any of them, much less all of them (I don’t even own them all). Also, you may want to check out the Stanford Encyclopedia of Philosophy, which can be found on-line for free at http://plato.stanford.edu/.
Schedule and Readings

- **Week 1:** Introduction  
  8/25: (no reading)  

- **Week 2:** Justifying Induction  

- **Week 3:** Popper and After  
  9/10: Imre Lakatos, “Science and Pseudoscience” (1973)

- **Week 4:** Underdetermination and Theory-Ladenness  
  9/17: W.V.O. Quine, “Two Dogmas of Empiricism” (1951)
• **Week 5:** Laws and D-N Explanations

• **Week 6:** Kuhn
  10/1: Thomas Kuhn, *The Structure of Scientific Revolutions* (1962), ch. 6–9

• **Week 7:** More Kuhn

  **PAPER OUTLINE DUE**

• **Week 8:** Values in Science
  10/15: Helen Longino, “Values and Objectivity” (1990)

• **Week 9:** Theory Change

• **Week 10:** Explanation, Redux

• **Week 11:** Realism and its Discontents

  **DRAFTS DUE TO PEERS**

• **Week 12:** Some Complicated Realisms: Entity and Structural

• **Week 13:** Constructive Empiricism

  **PEER REVIEW COMMENTS DUE**
  11/19: Howard Stein, “Yes, but… Some Skeptical Remarks on Realism and Anti-Realism” (1989)
• **Week 14**: Skepticism on Realism and Laws  
  11/24: Nancy Cartwright, “Fundamentalism vs. the Patchwork of Laws” (1994)  
  11/26: (thanksgiving break)

• **Week 15**: Special Topics  
  FINAL PAPER DRAFT DUE