

PHIL 411
Philosophy of Science
– University of Montana –
Spring 2010

Soazig Le Bihan

Syllabus

Course Information

- Course Number: PHIL 411
- Credits: 3
- Class meets: MW 3:40 - 5:00, LA 202
- Instructor: Soazig Le Bihan
 - Office Number: LA 153
 - Office Hours: Fridays 1-2 pm and 3:10-4pm
 - Mailbox: LA 101
 - Email: soazig.lebihan@umontana.edu
- Websites:
 - Note that all current course information (including class handouts, assignments, announcements, any revision of the schedule, exam questions, links etc.) can be found on the course web site
<http://www.soaziglebihan.org/1001-PHIL411.php>
 - Information about your grades: blackboard: <https://courseware.umt.edu>

Course Description

Scientific claims enjoy special epistemic status. They appear to be more secure and less open to interpretations than claims in other disciplines. In this class we seek to understand why scientific claims enjoy this status, and

to what extent it is deserved. To do so we will examine different characterizations of scientific theories as well as the relationships between theory, evidence, and explanation. Some of the characteristic questions we will explore are:

1. What is the nature and structure of scientific theories? What makes a scientific theory truly “scientific”?
2. What impact has the existence of scientific revolutions had on our ways of thinking about science? Do we have satisfactory criteria for theory choice?
3. What is the evidential and inferential basis of these theories: do the facts dictate the theories? How evidence can be taken as rationally supporting the acceptance and / or belief of a theory?
4. Does science explain phenomena? If yes, what makes an explanation scientific?
5. To what extent are our scientific theories true of the world? Do scientific laws correspond to laws of nature? What do scientific theories tell us about the constituents of the world?

Course Requirements

The final grade will be based on:

- Attendance and Participation: 20%
- 2 Syntheses: 10% each – total 20 %
- 2 Presentations: 10 % each – total 20 %
- 1 Research Paper: 40 %, including 1 prospectus (5%), 1st version (15 %), a rewrite (20 %)

Attendance Attendance is required, and necessary to succeed in the course. There will be a lot of material covered, and the material covered will be hard.

You are allowed to miss 2 classes without penalty. Following that, you will lose 2% up to a maximum of 10 per cent (that is, a letter grade) every time you miss a class without proper excuse.

You are expected to arrive on time and stay for the duration of the class. *Three late arrivals count as one absence.* If you have to leave early, please tell me at the beginning of class and sit close to the exit to minimize the disturbance to the class.

To attend a class does not mean merely sitting in class. You are expected to give your full attention to the class. Cell phones or other modes of communications should be silenced for the duration of class. You will be asked to leave if you are doing anything not relevant for class, e.g. reading the newspaper, sleeping, doing work for other classes, etc. *Three offenses of this type will count as one absence.*

That said, absences may be excused in cases of illness or other extreme circumstances. Relevant documentation is required in such cases. You also will be expected to have worked by yourself on the material covered during the classes you may have missed.

Participation I encourage you to participate in class. Trying to answer my questions or asking questions yourselves both qualify as participation. You will not be penalized for answering incorrectly. I want to emphasize that your questions are welcome and that you should leave the classroom with a good understanding of the material covered.

Syntheses There are about 10 themes in our program of study (from the demarcation problem to the issue of realism vs empiricism). To each theme corresponds a group of articles. When we will be finished with one of such groups, you will be required to write down a synthesis of the material we covered.

In a synthesis, you are expected to summarize what the main problem is, which kinds of solutions are available, and what the advantages and drawbacks are for each of these solutions are. Your synthesis can take the form of a schema, an outline with bullet points, or it can be a couple of paragraphs. In any case, it should fit on a single page.

I will collect your syntheses and grade a couple of them. You will not be told in advance which syntheses I grade – but I will have decided

in advance who is to be graded. I will turn your syntheses back to you once everybody in the class has a grade.

You will be penalized by 5 % every time you don't turn in your synthesis up to 20% without any excuse.

The last session during finals week will be devoted to a final synthesis session.

Presentations You will be required to present on two articles in class from secondary literature. These will be made in groups of two students. For your presentation you will have to have an excellent command of the article you are presenting on as you will be leading discussion. The presentations should have two parts: 1. A summary of the main question(s) the author(s) deal(s) with and their proposed solutions (taking not more than 30 min.) and 2. a set of problems formulated by your group for discussion. You should provide a handout (with your names written on it) to me and the class with a list of the problems for discussion.

To be clear, a problem is a reason for thinking the author's argument is defective in some way, i.e. defective premises or weak inductive argument structure. In addition, some of your questions might relate the article being discussed to previous work we have discussed.

I will expect to see a copy of your handout at least a week in advance of your presentation so I can give you feedback.

I am happy to meet with you to help you understand what's going on in your presentation article.

I recommend that one of your presentation be on an article related to your research paper.

Research Paper You will be required to write a paper on the order of 12 pages (no less than 10) on a topic of your choosing. Original thinking is necessary for a research paper. That said, original thinking does not amount to asserting your personal opinions without taking into account any appropriate literature on your topic. For a research paper, the challenge is to find a topic which is not too broad and to treat it incisively. In order to help you do this, I will require that you take on at least one secondary source (from a reputable collection of papers

or philosophy journals) as a starting point. Such a source should not have been used in class. Reference works, encyclopedia articles, etc. do not meet this requirement. I will be glad to assist in the selection and formulation of the topic. For most of research papers, one article is not enough: you are expected to do true research work, which involves surveying the relevant literature on the topic of your choice.

- You will be required to submit a prospectus by February 26. A prospectus should contain your thesis statement, a short outline of your argument, and a significant bibliography.

- You will be then required to turn a full draft of your paper by March 26, at 2 pm in my mailbox.

- The final version of your paper is due on May 3rd, at 2 pm in my mailbox

Both the first and the revised version of your paper count for your final grade (15 % and 20% respectively). I will give you comments on the first version of your paper. The final version of your paper will be largely graded considering how you responded to my comments on the earlier version of your paper. Concretely, if you get an A on the first draft, but do not take into account any of my comments, you may receive a D on the final version of your paper.

Note that the prospectus counts for 5% of your grade, that is, half a letter grade. You are expected to turn in a serious prospectus, which means that you should start working on your research paper right away. A research paper is a project for the entire semester. Don't expect to be able to get it done the week before it is due.

You should begin with choosing a theme among the ones we will cover in class. You are then expected:

- first, to read all the articles that will be covered in class on this theme,
- second, to browse through the further readings,
- third, to find one or two articles on which you want to focus your paper.

All papers must be typewritten, double-spaced, paginated, stapled, the notes at the bottom of the pages; no outline or bullet points. Follow any of the standard styles and formats.

Late Assignment Rules Late Assignments: without prior arrangements being made with the instructor, the grade of any late assignment will be lowered by one step of a letter grade a day (B+ to B for example).

IMPORTANT NOTE: If you encounter difficulties concerning an assignment, it is almost always possible to make arrangements before the assignment is due. No accommodation is possible once the deadline has passed. **COME AND TALK TO ME BEFORE IT IS TOO LATE.**

Writing Center Students from all levels can take advantage of the writing center (LA 144 : drop in or by appointment)

“The Writing Center exists to help all UM students improve their writing skills as they pursue their academic and professional goals. We provide free writing instruction through one-on-one tutoring, in-class workshops, and the Writing Assistant program.” (quoted from the writing center website)

The tutors won't write your paper for you, but they will teach you how to write better. For more information, go the website: http://www.umt.edu/writingcenter/welcom_about.htm

Academic Misconduct You are strictly held to the University of Montana Student Conduct Code (<http://www.umt.edu.SA>).

Unless collaborative work is specifically called for, work on assignments and exams is expected to be your own. In case of plagiarism, your assignment will receive a zero. You may fail the class altogether depending on circumstances. Also, I will report the case to the Dean.

I will be glad to answer questions you may have about how to document sources properly. Anytime you take a phrase or sentence from someone, you have to quote it. Anytime you take an idea from someone, you have to cite your sources.

Students with Disabilities If you are a student with a disability and wish to discuss reasonable accommodations for this course, contact me privately to discuss the specific modifications you wish to request. Please be advised I may request that you provide a letter from Disability Services for Students verifying your right to reasonable modifications. If you have not yet contacted Disability Services, located in Lommasson

Center 154, please do so in order to verify your disability and to coordinate your reasonable modifications. For more information, visit the Disability Services website at www.umt.edu/dss/.

Course Schedule

Textbooks

The readings are mostly taken out of:

- Curd and Cover, Ed., (1998) *Philosophy of Science: The Central Issues* (Paperback), W. W. Norton and Company; 1st ed edition (CC) – required for the class

Additional readings – posted on Blackboard – will be mostly taken out of:

- Boyd, Gasper and Trout, Ed., (1991) *Philosophy of Science*, MIT Press (BGT)
- Salmon et al. (1992) *Introduction to the Philosophy of Science*, Prentice-Hall

Important Dates

- January 25 (Mon) – classes begin
- February 15 (Mon) – Washington-Lincoln Day Holiday
- February 26 (Fri) – Prospectus due by email
- March 26 (Fri) – 1st version of the paper due at 2pm in my mailbox (LA 101)
- March 29-April 2 (Mon-Fri) – Spring Vacation
- April 5th – Drop date
- April 15-17(Thurs-Sat) – National Conference on Undergraduate Research

- May 3 (Mon) – Final Paper due at 2 pm in my mailbox
- May 12 (Wed) – Final session – 3:20 to 5:20

Proposed Schedule

We will try to cover the following reading list. Depending on how fast we go, I may remove one or several articles from the list. The list is partially based on Nick Huggett’s Philosophy of Science Bibliography.

You should expect to read about 40 to 50 pages a week. Remember that philosophy texts most often require to be read at least twice.

Part I: The nature and structure of scientific theories

Science and Pseudo-Science: Why is the distinction important?

- Popper, “Science: Conjectures and Refutations” (CC 3)
- Kuhn, “Logic of Discovery or Psychology of Research?” (CC 11)
- Lakatos, “Science and Pseudoscience” (CC 20)
- Thagard, “Why Astrology Is a Pseudoscience” (CC 27)
- Ruse, “Creation-Science Is Not Science” (CC 38)
- Laudan, “Commentary: Science at the Bar - Causes for Concern” (CC 48)
- Ruse, “Response to the Commentary: Pro Judice” (CC 54)

The Received view: Logical Positivism

- Schlick, “Positivism”, “Realism” par.II (BGT1).
- Boyd, “Confirmation, Semantics”; “Scientific Theories” (BGT 3-10).
- McGuire, “Scientific Change: Perspectives and Proposals”, 4.1-4.3, in Salmon et al 1992. p132 142.
- Further Suggestions:
 - John Passmore, *A Hundred Years of Philosophy* [1843-1963!]: Penguin Books, 1968. Ch16, “Logical Positivism”. A classic history of philosophical thought.

- (A J Ayer (ed), *Logical Positivism*: Free Press, 1959. A thorough collection of key essays of logical positivism.)
- Fred Suppe, “The Search for Philosophic Understanding of Scientific Theories” I-III, p3-61, in Suppe (ed), *The Structure of Scientific Theories*: University of Illinois Press, 1974.

Scientific Change: Rationality, objectivity, and values

- Kuhn, “The Nature and Necessity of Scientific Revolutions” (CC 86)
- Kuhn, “Objectivity, Value Judgment, and Theory Choice” (CC 102)
- Lakatos, “History of Science and Its Rational Reconstructions” in Hacking (ed), *Scientific Revolutions*: Oxford University Press, 1981. p107-127.
- Feyerabend, “How to Defend Society Against Science” in Hacking (ed), *Scientific Revolutions*: Oxford University Press, 1981. p156-167.
- Bruno Latour and Steve Woolgar, “From Order to Disorder”, *Laboratory Life: The Construction of Scientific Facts*: Princeton University Press, 1979/1988. Ch1.
- Alison Jaggar, “Love and Knowledge: Emotion in Feminist Epistemology”, *Inquiry* 32, 1989.
- Laudan, “Dissecting the Holist Picture of Scientific Change” (CC 139)
- Longino, “Values and Objectivity” (CC 170)
- Further Suggestions:
 - Thomas Kuhn, *The Structure of Scientific Revolutions*: University of Chicago Press, 1962. Especially Introduction, Ch 4, 7, 9 and Postscript.
 - Ian Hacking, “Introduction”, “Incommensurability” and “Reference” in Hacking, *Representing and Intervening*: Cambridge University Press, 1983. Ch5-6. A clear discussion of the basic ideas in Kuhn, in particular in comparison to the logical empiricists, and some of the responses to his alleged anti-realism.

- Hilary Putnam, “The ‘Corroboration’ of Theories and Explanation and Reference” (BGT 6 and 9). Important critiques of Kuhn (and Popper).
- Donald Davidson, “On the Very Idea of a Conceptual Scheme” in Davidson, *Inquiries into Truth and Interpretation*: Oxford University Press, 1984. Essay 13. A subtle undermining of the very coherence of Kuhn’s view.
- Newton-Smith, “T.S.Kuhn: From Revolutionary to Social Democrat” *The Rationality of Science: Routledge*, 1981. Ch5. A critique of the irrationality of scientific revolutions.
- (N R Hanson, *Patterns of Discovery*: Cambridge University Press, 1958. Especially Ch1-2. An account of how the world might look different after a ‘paradigm shift’.)
- (Kuhn, *The Copernican Revolution*: Harvard University Press, 1957. A detailed account of a scientific revolution: does it vindicate the claims of SSR?)
- Hacking, “A Surrogate for Truth” in Hacking, *Representing and Intervening*: Cambridge University Press, 1983. Ch8. An interpretation of Lakatos’ work.
- (Feyerabend, *Against Method*: New Left Books, 1977. Feyerabend’s classic work.)
- Larry Laudan, ”Progress or Rationality? The Prospects for Normative Naturalism” in *American Philosophical Quarterly*, 1987. p19-31. (Reprinted in Papineau (ed), *The Philosophy of Science*: Oxford University Press, 1996. p194-214.) A contemporary look at the issues.
- Howard Sankey, “Incommensurability: The Current State of Play” *Theoria* 12: 3 (1997), pp. 425-445 – also available on line.
- McGuire, ”Scientific Change: Perspectives and Proposals”, 4.14-17, in Salmon et al. 1992. p167-77. An introductory discussion of various ‘sociological’ approaches.
- James Brown, “Latour’s Prosaic Science”, in *Smoke and Mirrors: How Science Reflects Reality*: Routledge, 1994. Ch3. A robust critique of Latour.
- Helen Longino, *Science as Social Knowledge: Values and Ob-*

jectivity in Scientific Inquiry: Princeton University Press, 1989. An important recent study in the sociology of science, with different ends to Latour.

- Shirley Strum, *Almost Human: A journey into the World of Baboons*: Norton, 1987. An illustration (?) of the 'gendering of epistemology'.
- (David Bloor, *Knowledge and Social Imagery*: University of Chicago Press, 1976/1991. The classical statement of the 'strong programme' of the sociology of epistemology – there is no knowledge but social knowledge.
- Newton-Smith, "Strong Programmes" *The Rationality of Science*: Routledge, 1981. ChX. A critique of Bloor.)

The New "Orthodoxy": The Semantic View

- Fred Suppe, "The Search for Philosophic Understanding of Scientific Theories", IV.A-B, V. C, in Suppe (ed), *The Structure of Scientific Theories*: University of Illinois Press, 1974. p62-86, 221-30.
- Patrick Suppes, "What is a Scientific Theory?", in S.Morgenbesser (ed) *Philosophy of Science Today*: Basic Books, 1967. p55-67.
- Ronald Giere, *Understanding scientific theories*, part 2, Ch. 5.
- Ronald Giere, *Explaining Science*: University of Chicago Press, 1988. Ch3.
- Further Suggestions:
 - Suppes, Patrick (1960). "A Comparison of the Meaning and Uses of Models in Mathematics and the Empirical Sciences", *Synthese* 12: 287-301, reprinted in Suppes (1969): 10-23.
 - Suppes, Patrick (1962). "Models of data", reprinted in Suppes (1969): 24-35.
 - Suppes, Patrick (1969), *Studies in the Methodology and Foundations of Science: Selected Papers from 1951 to 1969* Dordrecht: Reidel
 - A. Gibbard, H.R. Varian, "Economic models", *The Journal of Philosophy*, 1978

- A. Rosenberg, “The puzzle of economic modeling”, *The Journal of Philosophy*, 1978
- Redhead, “Models in Physics”, *British Journal for Philosophy of Science* 31: 145-163.
- Cartwright, *How the laws of physics lie*, chap.3-5
- Morrison, Margaret (1999). “Models as Autonomous Agents” in Morgan and Morrison (1999): 38-65.
- Morgan, Mary S. and Margaret Morrison (1999). *Models as Mediators* Cambridge: Cambridge University Press.
- Thomson-Jones, Martin “Models and the Semantic View” PSA 2004

Part II: Theory and Evidence

Underdetermination and the Problem of Induction: From Hume to present

- Hume, *Treatise* Abstract.
- Duhem, *Aim and Structure of Physical Theory*: Princeton University Press, 1954. Part 2, Ch VI.1-4. p180-195.
- Quine, “Two Dogmas of Empiricism” (CC 280)
- Laudan, “Demystifying Underdetermination” (CC 320)
- Popper, “The Problem of Induction” (CC 426)
- Salmon, “Rational Prediction” (CC 433)
- Hempel, “Criteria of Confirmation and Acceptability” (CC 445)
- Goodman, *Fact, Fiction and Forecast*: various editions by Harvard University Press and now Dover. Ch III.
- Snyder, “Is Evidence Historical?” (CC 460)
- Achinstein, “Explanation v. Prediction: Which Carries More Weight?” (CC 481)
- Further Suggestions:
 - Karl Popper, “Science: Conjectures and Refutations” in Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge*: Basic Books, 1962. p33-59.

- Bertrand Russell, “On Induction” in Russell, *The Problems of Philosophy*: available in a number of editions. Ch VI. Another classic statement of the problem of induction.
- Earman and Salmon, “Confirmation of Scientific Hypotheses” 2.5-2.6 in Salmon et al 1992. p55-66. A survey of the problem and the many attempts to solve it.
- Schilpp (ed), *The Philosophy of Karl Popper*: Open Court, 1974. Especially articles by Neale and Maxwell. A collection of papers dealing with the various aspects of Popper’s work.
- Stalker (ed), *Grue: The New Riddle of Induction*: Open Court, 1994. Especially articles by Scheffler, Harman and Hacking. A collection of key responses, and a comprehensive annotated bibliography of the literature.
- Hempel, *Empiricist Criteria of Cognitive Significance: Problems and Changes* (BGT3)
- (Duhem, *Aim and Structure of Physical Theory*: Princeton University Press, 1954. Part 2, ChVI.8-10. p208-218.)

Models of Confirmation: From the early accounts to Bayesian approaches

- Hempel, “Studies in the Logic of Confirmation” 1-6 in Hempel, *Aspects of Scientific Explanation and Other Essays*: Free Press, 1965. p3-25.
- Salmon, “Rationality and Objectivity in Science or Tom Kuhn Meets Tom Bayes” (CC 551)
- Glymour, “Why I Am Not a Bayesian” (CC 584)
- Horwich, “Wittgensteinian Bayesianism” (CC 607)
- Further Suggestions:
 - Earman and Salmon, ”Confirmation of Scientific Hypotheses” 2.1-2.4, 2.9-11 in Salmon et al. 1992. p42-55, 89-100. An introduction to Hempel’s theory and its background, and a basic account of Bootstrapping and Bayesian alternatives.
 - Colin Howson and Peter Urbach, *Scientific Reasoning: The Bayesian Approach*: Open Court, 1989. A more thorough, but easy going introduction to Bayesianism.

Part III: Theory – World Relations

Laws of Nature: do laws of science capture laws of nature?

- Ayer, “What Is a Law of Nature?” (CC 808)
- Dretske, “Laws of Nature” (CC 826)
- Mellor, “Necessities and Universals in Natural Laws” (CC 846)
- Cartwright, “Do the Laws of Physics State the Facts?” (CC 865)
- Further Suggestions:
 - Armstrong, D. 1983 “What is a Law of Nature?”
 - Psillos, S. 2002 *Causation and Explanation* sect II
 - Carroll, J. 1994, *Laws of Nature*: Cambridge: Cambridge University Press.
 - Carroll, J.(ed.) 2004 *Readings on Laws of Nature*: Pittsburgh: Pittsburgh University Press.
 - Bird, A. 2005 “The Dispositionalist Conception of Laws” *Foundations of Science*, 10: 353-370.
 - Giere, R. 1999 *Science Without Laws*: Chicago: University of Chicago Press.
 - Earman, J., Glymour, C., and Mitchell, S., (eds.), 2003, *Ceteris Paribus Laws*, Berlin: Springer.
 - Earman, J. and Roberts, J., 1999, “Ceteris Paribus, There is No Problem of Provisos”, *Synthese*, 118: 439-478.

Models of Explanation: From DN to IBE

- Carnap, “The Value of Laws: Explanation and Prediction” (CC 678)
- Hempel, “Two Basic Types of Scientific Explanation” (CC 685)
- Hempel, “The Thesis of Structural Identity” (CC 695)
- Hempel, “Inductive-Statistical Explanation” (CC 706)
- Hempel, “Laws and Their Role in Scientific Explanation” (BGT p299-307).
- Ruben, “Arguments, Laws and Explanation” (CC 720)

- Railton, “A Deductive-Nomological Model of Probabilistic Explanation” (CC 746)
- Michael Friedman, “Explanation and Scientific Understanding”, in *Journal of Philosophy*, Vol 73. p5-19
- Bas van Fraassen, “Pragmatics of Explanation” (BGT17).
- Michael Scriven, “Explanation and Prediction in Evolutionary Theory” in *Science*, Vol 130.3374: 1959. p477-482
- Peter Lipton, 1991 *Inference to the Best Explanation* (chap. 1, 4, 6, 7)
- Peter Lipton, 1993 Is the Best Good Enough? in Papineau, D. (ed) 1996 *The Philosophy of Science*
- Further Suggestions:
 - Achinstein, P. 1981 “Can there be a Model of Explanation?” in Ruben (ed) 1993.
 - Wesley Salmon, “Scientific Explanation” 1.1-1.10, in Salmon et al. 1992. Ch1, p7-29. An introduction to the key theories and ideas of this week’s work.
 - Hempel and Oppenheim, “Studies in the Logic of Explanation” Part I, in Hempel, *Aspects of Scientific Explanation and Other Essays*: Free Press, 1965. p245-258. The classic modern starting point.
 - (Scriven, “Explanations, Predictions and Laws”, in Feigl and Maxwell (eds), *Minnesota Studies in the Philosophy of Science*, Vol 3: University of Minnesota Press, 1962. p.170-230. A full-out assault on the D-N model.)
 - David Lewis, “Causation” in *Journal of Philosophy* 70, 1973. 556-67. An alternative to a regularity account, and some insight into counterfactuals.
 - David Lewis 1986 “Causal Explanation” in Lewis 1986 *Philosophical Papers* vol II.
 - Wesley Salmon, “Scientific Explanation” 15.1-1.17, in Salmon et al. 1992. Ch1, p33-39. An introduction to the key theories and ideas of this week’s work.

- Wesley Salmon, *Four Decades of Scientific Explanation*: University of Minnesota Press, 1990. A complete survey of work on explanation: dip in as needed.
- Peter Lipton 1990 Contrastive Explanation in Ruben (ed) 1993.
- Ruben (ed) 1993 *Explanation*: Readings in Philosophy Series: Oxford University Press

Empiricism and scientific realism: What does science tell us about the world?

- Maxwell, “The Ontological Status of Theoretical Entities” (CC 1052)
- van Fraassen, “Arguments Concerning Scientific Realism” (CC 1064)
- Musgrave, R “ealism versus Constructive Empiricism” (CC 1088)
- Laudan, “A Confutation of Convergent Realism” (CC 1114)
- Brown, “Explaining the Success of Science” (CC 1136)
- Arthur Fine, “The Natural Ontological Attitude” (BGT14)
- Hacking, “Experimentation and Scientific Realism” (CC 1153)
- Resnik, “Hacking’s Experimental Realism” (CC 1169)
- Nancy Cartwright, “Reality of Causes in a World of Instrumental Laws” (BGT20).
- Further Suggestions:
 - Psillos 1999 *Scientific Realism: How science tracks truth*: Routledge.
 - Musgrave, A. 1989 “NOAs Ark-Fine for Realism” in Papineau, D. (ed) 1996.
 - Boyd, R. 1983 “On the Current Statues of Scientific Realism” (BGT)
 - Clark Glymour, “Realism and the Nature of Theories”, Ch 3, in Salmon et al. 1992. p104-131. An introduction to the topic of realism and anti-realism.

- Arthur Fine, “And not Anti-Realism Either”, in *The Shaky Game*: University of Chicago Press, 1986. Ch 8. In the main selection the arguments concentrate on distinguishing the NOA from realism: but it is also to be distinguished from anti realism as traditionally understood.
- Ernan McMullin, “Selective Anti-Realism”, in *Philosophical Studies*, 1991. p97-108. An article disputing the claim that there is stable ground for the NOA.
- Joseph Rouse, “The Politics of Postmodern Philosophy of Science”, in *Philosophy of Science*, 1991. p 607-627. An interpretation of the NOA that draws out similarities to other recent developments in social and humanistic studies.
- Hacking, “Building and Causing” and ”Intervening” in *Representing and Intervening*: Cambridge University Press, 1983. Ch2 and Part II. Comments on Cartwright, and the full development of Hacking’s views.
- Hacking, “Extragalactic Reality: The Case of Gravitational Lensing”, in *Philosophy of Science*, 1989. p555-71. A case study of Hacking’s entity realism.
- Alan Gross, “Reinventing Certainty: The Significance of Ian Hacking’s Realism”, in *PSA 1990: Proceedings of the Philosophy of Science Association Conference*: Philosophy of Science Association, 1990. p421-431. An analysis of Hacking’s views.
- Nancy Cartwright, Introduction and Essay 7 of *How the Laws of Physics Lie*: Oxford University Press, 1983. Additional material outlining Cartwright’s position.
- Cartwright, “Fundamentalism vs the Patchwork of Laws” in *Proceedings of the Aristotelian Society*, 93.2, 1994. p279-92. (Reprinted in Papineau (ed), *The Philosophy of Science*: Oxford University Press, 1996. p314-326.) Indicative of the direction Cartwright’s work has developed.
- Laymon, “Cartwright and the Lying Laws of Physics”, in *Journal of Philosophy*, 1989. p353-72. Further development and discussion of Cartwright.

Grading Policies

The following are generic grading policies. Refer to the appropriate sections depending on the particular course requirements of the class you are taking.

Participation evaluation

- A range: The student is fully engaged and highly motivated. This student is well prepared, having read the assigned texts, and has thought carefully about the texts' relation to issues raised in lecture and section. This student's ideas and questions are substantive (either constructive or critical); they stimulate class discussions. This student listens and responds to the contributions of other students.
- B range: The student participates consistently in discussion. This student comes to section well prepared and contributes quite regularly by sharing thoughts and questions that show insight and a familiarity with the material. This student refers to the materials discussed in lecture and shows interest in other students' contributions.
- C range: The student meets the basic requirements of section participation. This student is usually prepared and participates once in a while but not regularly. This student's contributions relate to the texts and the lectures and offer a few insightful ideas, but do not facilitate a discussion.
- Failure to fulfill satisfactorily any of these criteria will result in a grade of "D" or below.

Homework evaluation

I am in general very generous in grading homework. The point of the homework assignments is to help you to focus on the important points during your reading.

- A range: Readings are very well understood. Only minor problems (up to four for a five questions assignment) remain. The assignment is written in whole sentences, good English and clear style.

- B range: There is either too many minor problems, or a few minor problems plus one major problem on one of the questions, or more than two major problems in the understanding of the readings. The assignment is not fulfilling one or more of these requirements of the A-range: whole sentences, good English and clear style.
- C range: There is a major problem for all questions. The assigned material was read, but not understood.
- Failure to fulfill satisfactorily any of these criteria will result in a grade of "D" or below.

Text analysis and presentation evaluation

- A range: You present an accurate reconstruction of the problem that the author is dealing with, an accurate and charitable reconstruction of the arguments pertaining to that problem, and a careful criticism of the author's arguments via your discussion questions. You take an active role leading discussion of the paper by responding to student's comments. In particular, you will have anticipated responses to your discussion questions, especially how you think the author(s) might respond, and use those to draw out more elaborate comments about student's responses or to generate further discussion.
- B range: You present a reasonable reconstruction of the problem that the author is dealing with, a charitable reconstruction of the arguments pertaining to that problem, and some criticism of the author's arguments via your discussion questions. You will lead discussion of the paper and respond to student's comments.
- C range: You state the topic of the paper without articulating the problem that the author intends to address. You provide a summary of the paper (mere chronology without isolating the main arguments). You provide discussion questions that are related to the text, but aren't primarily geared to addressing possible weaknesses in the author's argument. You ask questions, but don't develop discussion.
- Failure to fulfill satisfactorily any of these criteria will result in a grade of "D" or below.

Paper / Essay evaluation

Six criteria for evaluating a paper:

- Substance,
- Thesis and argument structure, including introduction and conclusion,
- Use of supporting material and evidence,
- Quality of analysis, including the crucial distinction between unsupported assumptions, value judgments vs. analysis and argumentation,
- Use of quality sources,
- Quality of writing including grammatical correction, clarity, concision and persuasiveness.

Objectives for a good paper: rigorous inquiry, critical thinking, effective written argumentation.

- A range: This paper is outstanding in form and content.
 - The materials covered in class is understood in depth: the student shows that he or she has a command on the materials, including a critical understanding.
 - The thesis is clear and insightful; it is original, or it expands in a new way on ideas presented in the course.
 - The argument is unified and coherent.
 - The evidence presented in support of the argument is carefully chosen and deftly handled.
 - The analysis is complex and nuanced.
 - The sources are original texts or quality scholars' literature.
 - No grammatical mistakes, clear, precise and concise style.
- B range: The argument, while coherent, does not have the complexity, the insight, or the integrated structure of an A range paper.
 - The material covered in class is well understood: the student does not make any mistake on the materials but does not show great depth in critical understanding.

- The paper's thesis is clear.
 - The argument is coherent.
 - The paper presents evidence in support of its points.
 - The paper is reasonably well written and proofread.
- C range: This paper has some but not all of the basic components of an argumentative essay (i.e., thesis, evidence, coherent structure).
For example:
 - a clear misunderstanding of some of the material covered in class, or
 - no clear or incoherent thesis, or
 - incoherent structure of argument, for example simply repeats points made in class without an overall argument, or
 - presents no evidence in support the thesis
 - no use of original texts, but only secondary or popular literature (encyclopedia...)
 - poorly written and proofread.
 - A paper will fall below a "C" if it lacks more than one of the basic components of an argumentative essay.

Sources

- Tips for grading in the humanities, Stanford Center for Teaching and Learning website
- Introduction to the Humanities Program, STANFORD UNIVERSITY, Information for Faculty, 2005-06
<http://www.stanford.edu/dept/undergrad/ihum/instructors/>

