Philosophy 3330: Philosophy of Science
Spring 2014, First Paper Assignment

Instructions: Write a paper of approximately 1,500-2000 words. The general guidelines are as follows. First, your paper must critically engage one or more of the topics we have discussed in the first nine weeks of class. Second, your paper should not *merely* summarize the position(s) of some of the authors you discuss; it should in some way locate them relative to each other, synthesize those ideas, criticize them, defend them against important objections, or develop them in your own way. Third, the topic of your paper should be of an appropriate scope given the length constraints. Some students will have strong backgrounds in some area of science that they may wish to bring to bear in their papers. This is fully encouraged, so long as: (i) all of the technical ideas are explained as clearly as possible within the constraints of the length limits of the paper; and (ii) your paper grapples directly with the philosophical issues raised in this course, and is not merely an exposition of the relevant science. However, careful engagement with the details of some science or other is not required for a good paper.

Due Date: You must submit your paper to me by email before the start of class on Friday, March 28th. Any easily readable format such as .pdf or .doc is okay.

Grading: This paper is worth roughly 25% of your final grade.

References: All sources used in the writing of your paper must be properly referenced. This applies to material in the course readings, other published material, lecture notes from this class and other classes, material 'published' on the internet, and ideas contributed verbally by other students. Information about proper procedures and formats for references can be found on the course website. Failure to follow these guidelines may result in a lowered grade or even an automatic F in the course; it may also lead to charges being brought before the university. If you have any questions about these issues, please do not hesitate to contact me.

Advice on Writing a Philosophy Paper: The course website contains several handouts on writing a philosophy paper, as well as links to websites on the topic.

Reading Drafts: I am happy to talk about your papers during office hours or if you make an appointment to meet me in my office. I am also happy to read drafts of papers, on a time-permitting, first-come, first-served basis. For example, if you get a draft to me on Monday the 24th, it is likely that I can get it back to you by Tuesday or Wednesday. Monday is about the latest day I can be sure that I can get a draft back to you.

Topics: The topics offered below are given as suggestions: you may address one of them as is, you may modify one of these topics, or you may create your own topic. If you create a question very different from one of the ones below, you should check with me first about whether this would be okay. Whatever topic you may choose, your essay should have a title that clearly and accurately reflects what the essay is about. If you would like further readings that may be helpful in addressing some of these topics; I recommend starting with the Stanford Encyclopedia of Philosophy. Asking me for advice for what to look at is also a very good idea.

1. Is there a good way to separate science from pseudoscience?

2. What is the right way to think about the relationship between science and religion?

3. Are there crucial experiments in science? Or is there a reason to think that holism about

scientific testing means that we can't test single claims or even theories in isolation from other theories?

4. What can we say about the past success of inductive methods and does this success in any way justify the use of these methods? Is the charge of circularity from Hume and Salmon against such justification avoidable?

7. Critics of subjective Bayesianism, especially for use in science, often worry that the reliance on individuals prior probabilities to determine what counts as evidence for what and to what degree imparts an unacceptable relativism into science where we should have a robust kind of objectivity. Is this a fair criticism?

8. Does Bayesian Confirmation Theory solve the problem of induction?

9. Hempel's deductive nomological model of explanation claims that laws of nature are essential parts of good scientific explanations. Is this right?

10. Do good explanations in different sciences differ in some fundamentally different way? Or is there some unifying idea behind good scientific explanations? Or is there a plurality of good kinds of explanations even within the same disciplines?

11. What role, if any, does simplicity play in good scientific reasoning?

12. Are there laws in biology?

13. Kuhn divides science into periods of 'normal science' and 'revolutions'. Is this descriptively accurate of how science proceeds? Are periods of revolutions fundamentally different from the normal course of scientific progress? Is it different across different sciences?

14. Kuhn describes normal science as 'puzzle-solving'. What does he mean by this? How does this compare to Popper's account of severely testing theories by trying to falsify them? Which is a more accurately portrayal of good scientific practice?

15. What does Kuhn have in mind by a 'paradigm'? (You should read the postscript to SSR if you are writing about this.) Does good scientific practice allow for scientists to work in a paradigm in this sense? Does it require them to? How can scientists in different paradigms (across disciplines or across time) relate to each other?

16. Kuhn is sometimes accused of making revolutions out to be completely irrational. Is this a problem for Kuhn? Could paradigm shifts be rational? How and under what circumstances?

17. In illustrating his views, Kuhn relies primarily on revolutionary episodes in the physical sciences. (The Copernican Revolution, Newton, Franklin's electrical theory, Einstein's theory of relativity). Darwin's *Origin of Species* triggered a major revolution in biology. How well does this example fit Kuhn's framework? Or alternatively, how well does the Mendelian revolution or the molecular biology revolution fit this picture?