

Philosophy of Science

PHIL 220: Fall 2014

Mondays and Wednesdays, 3–4:22 PM

Course Blog: <http://philsci.blogs.bucknell.edu/>

Location: Coleman 119

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office hours: Tuesdays 1–2PM and Fridays 11AM–noon (or by appointment)

Topics Philosophy and the natural sciences have long enjoyed a close association. The twentieth century in particular saw unprecedented philosophical focus on a series of related conceptual and methodological questions concerning science. What divides science from pseudo-science? What is it to “explain” phenomena? How do the sciences provide greater understanding of the natural world? Is there a distinctive “scientific method”? Do scientists have special ethical obligations? How should democratic societies go about ordering their research priorities? What role should for-profit industry play in scientific discovery? We shall address these and other questions through a mixture of philosophical argument and detailed examination of case studies across the sciences.

Learning Goals In successfully completing this course, you should:

- ✦ Gain a deep understanding of the debates about scientific methodology;
- ✦ Gain a deep understanding of key epistemological issues in science (e.g., the justifiability of induction, the nature of evidence, and the role of theory in observation);
- ✦ Gain a sophisticated understanding of science as a social phenomenon and institution;
- ✦ Develop your skill in constructing and evaluating argumentation;
- ✦ Gain a general appreciation of the fundamental ambiguities and complexities involved in the human attempt to answer questions about knowing, valuing, and living.

Note: This is a W2-designated course. We will often use writing (in various forms and in various outlets) to develop our ideas about course topics. Writing will also itself be a subject of instruction. Take this seriously and you will both become better writers and come to appreciate more deeply how the process of writing is often conducive to careful thinking. I won't lie: doing this will require a good amount of work, but I will strive to make it non-onerous. Nothing in this course is busywork. If it seems like busywork, I would encourage you to reflect on how you are approaching it and/or come speak with me.

Assigned Readings McGrew, Alspector-Kelly, Allhoff (Eds.) *Philosophy of Science: An Historical Anthology*, Ben Goodacre, *Bad Pharma*, + other papers provided in PDF on the course blog

Evaluation

Grades at Bucknell are to be assigned based on demonstration of academic achievement; according to the Course Catalog (www.bucknell.edu/catalog.xml), an 'A' means 'Superior achievement', a 'B' means 'High pass', a 'C' means 'Pass', a 'D' means 'Low pass', and an 'F', of course, stands for 'Failing work'. Your final grade will be based the various weighted components described below.

Participation & Professionalism (20%) To begin with the obvious: you should come to every class meeting on time and plan to remain for the whole time, giving our conversation your full attention (=no computers, tablets, phones, cans-on-a-string, &c.). In general, think of your interaction in the class as analogous to expectations you'd face in most workplaces. Since much of our time in class will be spent discussing some conceptually difficult and occasionally abstract questions and issues, it is crucial that you *come prepared*. This means not only passing your eyes over the reading assigned for that day, but (at minimum) making a serious attempt to critically engage with it (perhaps over the course of several passes) and coming to class ready to share the fruits of your labors, asking questions, offering interpretations, sharing bits that puzzled you or seemed outright wrong, and so on. Your journal and reflection papers (below) constitute part of this preparation.

I will often post supplemental/background/further reading for each topic that I think you'd benefit from examining. I ask you to read these at least occasionally. I'd also like you to listen to the weekly *Nature* podcast <nature.com/podcast>, published by the most influential general scientific journal on the planet. *Science* is another excellent generalist journal that you should regularly read. Bucknell has institutional subscriptions to both; I'd encourage you to occasionally browse these (at least their news sections). If you want to understand science at a deep level, you need to maintain some minimal familiarity with what's going on in science *right now*.

- Quizzes** (10%) I will sometimes begin class with an unannounced, short (<10 minute) quiz. These may address concepts/ issues/theories we covered in the previous week (thus it is in your interest to make sure that you are clear on these) or concern issues from the reading assigned for that class (at a slightly more basic level). Your lowest quiz score will be dropped.
- Weekly Reflection Writing** (20%) Each week, I will post on the course blog a series of questions and issues to think about as you read. Your reflection papers may either respond to one or two of these or raise a question of your own, so long as has some substance to it. Generally speaking, I'd like your responses to come in at somewhere around 200–400 words (i.e., about a page). I should get at least one a week, *at least an hour before the relevant class*, though you may submit more if you like. Grades will be assigned on a simple 0–3 basis, where 0=“Insufficient/Incomplete”, 1= “Getting There”, 2= “Good; Meets my Expectations”, 3= “Exceeds My Expectations”. I will drop your worst two weeks of postings, average the rest, and curve things so that an average of 2.0 lands on a B/B+. (See the course blog for more information about what I am looking for with these and for examples of past successful reflection pieces.)
- The Box Project** (15%) Throughout the term, small groups will compete with one another to unravel a puzzle that has perplexed and enthralled *dozens* of students before you: “What’s in that cardboard box?” In so doing, you will reflect on our study of the methodology, sociology, psychology, and philosophy of science. Each group will maintain a blog on which your travails with the box and reflections upon them are documented. Your grade will be based on this online group document and a final presentation, not on your ultimate success in divining the secrets of the box. Further details will be explained in due course.
- Formal Essays** (35%) The formal writing component in this course will probably seem a little untraditional, but I hope that you’ll see its advantages. In the course of the term, I will assign two short essays (~1,000–1,500 word) that you will revise and rework (with the help of commentary from me and your peers). Your grade on these shorter essays will depend primarily on your *effort* (both in writing/ revising and in helping your classmates with their revisions). You will then consult with me about a plan for your final essay (~2,000–2,500 words) — either reworking/expanding one of your previous papers or forging into new territory. You will again have the opportunity to receive comments on a draft before submitting an essay which, by this time, you can be reasonably confident will be successful. This final essay will comprise the majority of your grade for this component of the course and will be marked according to your *achievement*.
- Policy on Absence and Late Work** Late reflection writings will be ineligible for ‘3’s; they will receive at most a ‘1’ if submitted more than 24 hours late; and a ‘0’ after that. Missed quizzes cannot be made up due to absence or tardiness. They may, however, be dropped from your gradebook if I hear about a legitimate reason for your needing to miss class *before class*. Do not assume our understandings of ‘legitimate’ match. Retrospective excuses will be granted only in emergency situations. Late essays will be penalized by 1/3 of a letter grade per partial day late (e.g., after 36 hours, an A– paper receives a B).
- Office Hours** You are invited and encouraged to supplement your in-class learning by visiting me in my allotted office hours or at some other time that suits us both. You don’t need an appointment to come to office hours; just drop by. You can also contact me via Skype (my username can be found on our Moodle page); if you see me online, you may assume that I’m happy to chat.
- Academic Honesty** I expect you to abide by Bucknell’s Honor Code (<http://www.bucknell.edu/x1324.xml>). In particular, unless otherwise instructed, your written work must correctly and completely cite all materials used (including primary sources, textbooks, websites, and other material from the internet you consult, quote, or paraphrase). Failure to do so is a cardinal academic sin which is taken very seriously here and can result in your suspension or expulsion if committed. I will not hesitate to refer students who commit any form of academic dishonesty to the University Board of Review (www.bucknell.edu/x1337.xml). The one exception to this policy is that in your Weekly Reflection Writings, you need not provide the bibliography entry for an assigned source, so long as it is clear from context what you are referring to (and where). See the course blog for more detail on this.
- Reasonable Accommodations** If you have a disability that may affect your work in this course, please talk to me (either by email or in person) at your earliest convenience and I will make every effort to accommodate your needs. If you have not yet spoken with someone in the Office of Accessibility Resources (OAR) about your disability, please do so as soon as possible. Accommodations must be sanctioned by that office. For more info, see www.bucknell.edu/campus-life/office-of-accessibility-resources/.