

PHIL 12

SCIENTIFIC REASONING

Course Description

Winter 2015

Lead Instructor: Kerry McKenzie

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Office: HSS 8088 **Office Hours:** Thursday 10-12pm

<i>Wk: Date</i>	<i>Topic</i>
1: 01/05	1. Introduction and Overview
1: 01/07	2. Introduction to Argument
1: 01/09	3. Deductive arguments
2: 01/12	4. Inductive arguments
2: 01/14	5. Inductive Generalization: Polling and Sampling
2: 01/16	6. Imprecision and Confidence Level
3: 01/21	7. Correlations and Statistical Significance
3: 01/23	8. Introduction to Causation
4: 01/26	9. Mill's Methods for Inferring Causes
4: 01/28	10. Clinical Methods 1: Clinical Trials
4: 01/30	11. Clinical Methods 2: Animal Testing
5: 02/02	12. Review of Causation and Clinical Methods
5: 02/04	13. Confirmation of hypotheses: the HD model
5: 02/06	14. HD and the Duhem-Quine problem
6: 02/09	15. HD and Underdetermination
6: 02/11	16. Inference to the Best Explanation
6: 02/13	17. Hume's problem of induction
7: 02/18	18. The problem of induction and selective scepticism
7: 02/20	19. How to write a philosophy essay
8: 02/23	20. In-class exam
8: 02/25	21. Introduction to Science vs Pseudoscience
8: 02/27	22. Demarcation 1: Popper
9: 02/02	23. Demarcation 2: Kuhn
9: 02/04	24. Demarcation 3: Lakatos
9: 02/06	25. Case study: Astrology
10: 02/09	26. The status of astrology
10: 02/11	27. Science, pseudoscience and bad science
10: 02/13	28. Essay Exchange / Trouble Shooting

1 Objectives, methods, requirements

1.1 What this course is about

This course concerns a topic of great social, philosophical, and personal significance: the nature and justification of scientific knowledge. In it, we will look at a range of topics including: the nature of inductive justification; how the statistics describing the makeup of societies and the likely outcomes of our lifestyle choices are arrived at; how we acquire knowledge of unobservable entities such as quarks and electrons; and what, if anything, makes scientific theories different in kind from those of other disciplines, such as the humanities and ‘quack’ theories such as parapsychology and astrology.

A key theme running throughout the course is that, although we take science to be the paradigm of rational activity, scientific knowledge is never certain. But many incompatible claims on how to think about the world and how to act in it compete for our assent – claims that come from folk theories, pseudosciences, and indeed the sciences themselves. As such, it seems that we must negotiate a concept of justification that is, on the one hand, relaxed enough to allow some theoretical claims to be regarded as sufficiently justified even though they lack certainty, while on the other hand is strong enough to exclude many such claims. Thinking about how good is good enough will be a recurrent theme in what we do.

1.2 Objectives

On completion of this module students should be able to critically discuss a variety of issues concerning the nature of scientific evidence and the ways in which scientific theories are justified. The main topics include: inductive and causal reasoning; confirmation and the scientific method; the demarcation of science from non-science.

1.3 Assessment

There are five parts to your assessment.

- Assignment on concepts of argument (7.5%) – submit by 4pm, Tuesday 20th Jan
- Assignment unpicking a scientific paper (7.5%) – submit by 4pm, Monday 4th February
- In-class exam (40%) – 1pm, 23rd February
- Term paper (35%) – submit by 4pm, Friday 13th March.
- Attendance (10%) – 1% per session with your TA.

Exam. Ahead of time, you will be given six questions to think about, of which three will be chosen for the exam. You will write short essays on two.

Term paper. Your paper should be 1,500 words (+/- 10%) long. In class we will discuss the sort of thing I’m looking for you in your term paper and mini exam essays. But in grading the essays the TA’s will be looking for three things, weighted roughly equally:

Comprehension: understanding of the concepts and ideas discussed in the essay.

Clarity: presentation of the ideas and concepts in a clear and concise manner.

Engagement: independent thinking about the items under discussion.

You must submit both a hard copy of your paper as well as submit it through Turnitin.

Grading scale.

$95 - 100 = A^+$	$78 - 80 = B^+$	$68 - 70 = C^+$	$58 - 60 = D^+$
$85 - 94 = A$	$75 - 77 = B$	$65 - 67 = C$	$50 - 57 = D$
$81 - 84 = A^-$	$71 - 74 = B^-$	$61 - 64 = C^-$	$< 50 = F$

Academic Integrity.

UCSD is committed to academic integrity. According to their *Policy on Integrity of Scholarship*,¹

“Integrity of scholarship is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual to whom it is assigned, without unauthorized aid of any kind.”

If you are unsure in any way of what acting with integrity demands of you in this context, I’ll be happy to discuss it with you.

Set reading. You should acquire *Scientific Thinking* by Robert M. Martin. Extra readings will be put up on TED. Don’t hesitate to get in touch if you would like anything else to read!

¹For the full statement, go to <https://students.ucsd.edu/academics/academic-integrity/policy.html>