

PHILOSOPHY OF SCIENCE

PHIL 430, Sec. 1001: MW 11:30am-12:45pm in WRI C212

University of Nevada, Las Vegas

Spring 2026

COURSE TOPICS LIST

1. The different methods Peirce identifies for fixation of belief, and why he says the scientific method is superior.
2. Logical Empiricism's general views about how science needs to be analyzed to legitimize it as a means of producing knowledge, including verificationism about empirical content.
3. Hempel on scientific hypothesis formation.
4. Hempel's verificationism on empirical import and non-scientific or pseudo-hypotheses.
5. Hempel on scientific hypothesis testing: confirmation vs. falsification.
6. The effects on falsification of recognizing the role of auxiliary hypotheses.
7. Problem of *ad hoc* hypotheses.
8. The traditional problem of induction (Hume).
9. Goodman's New Riddle of Induction, and how it differs from Hume's problem.
10. Law-like generalizations vs. accidental generalizations; the projectability of predicates.
11. Popper's deductivist Falsificationism about scientific method as a process of making bold conjectures and attempting to falsify them.
12. Popper's notion of corroboration vs. (Hempel's notion of) confirmation.
13. Problems for Popper's Falsificationism.
14. Basic ideas of Bayesian confirmation theory and subjectivism concerns.
15. Hempel's D-N and I-S models of scientific explanation.
16. The goals and merits of scientific theorizing.
17. Hempel's analysis of the structure of theories in terms of internal principles and bridge principles.
18. Realism vs. instrumentalism vs. reductionism (phenomenalism) about theoretical claims.
19. Underdetermination of theory by data as a challenge to realism about theoretical claims.
20. Defining theoretical terms to have empirical import: operationalism and the fragmentation worry for systematic import.
21. Ramsey sentence definition of theoretical terms, capturing systematic import, worries about theory incorrectness, and modification into law-cluster definition.
22. Theoretical Reduction's two parts: extensional definition of higher-level theoretical terms and entailment of the higher-level theory's laws from lower-level laws via bridge laws.
23. Mechanism as a reductive program of attempting to reduce all higher-level scientific theories ultimately to physics.
24. Traditional static/monolithic picture of science and scientific method that Kuhn rejects.
25. Kuhn on immature vs. mature science (emergence of a paradigm).
26. Kuhn's radically discontinuous, repeating-cycle stages view of the development of science.
27. Scientific paradigms and their guiding and normative role in scientific activity.
28. Incommensurability: semantic (no continuity of reference, from law-cluster theory of meaning) and perceptual (from theory-laden or paradigm-infected nature of all observation).
29. Scientific Revolutions as non-empirical, non-rational paradigm shifts in response to crisis stage.

30. Paradigm shift as involving a change in the world that scientists occupy and investigate.
31. Kuhn's view of scientific progress as non-cumulative, non-truth-increasing. The evolutionary analogy for progress.
32. Lakatos on "internal history" vs. "external history" in any account of science.
33. Lakatos's notion of a scientific research program, and the structure this involves.
34. The difference between a progressive scientific research program and a degenerating one.
35. Similarities and differences between Lakatos's account of science and Kuhn's account.
36. Van Fraassen on Scientific Realism, Logical Empiricism, and Constructive Empiricism. Overlaps and differences.
37. Empirically adequacy theories (vs. true theories) as the aim of science. Acceptance vs. belief.
38. Van Fraassen on the observable/unobservable distinction and the realist critique of it (or of the "theoretical/observational" distinction, as they used to put it).
39. Scientific Realism as an endorsement of Inference to the Best Explanation and vF's restriction on IBE.
40. Scientific Realism's "No Miracles" argument from the empirical/predictive success of theories.
41. Laudan's description of Scientific Realism (Convergent Epistemological Realism).
42. Laudan's critiques of CER's attempt to link the empirical and practical success of theories with their approximate truth, and of CER's claim that latter theories preserve the referents of earlier ones, as both historically and methodologically false.
43. Boyd's understanding of the basic claims of Scientific Realism (SR).
44. Boyd's contrasts of Empiricist and Constructivist Anti-Realisms with SR.
45. Boyd's account of the central critiques of SR from Empiricism and from Constructivism, the traditional realist replies, and the weaknesses of the traditional realist replies.
46. Boyd's new argument for SR, focusing on the instrumental reliability of scientific method, and how it acknowledges much of the anti-realist challenges.
47. Critique of Boyd's argument for SR as circular (from Arthur Fine).
48. Fine's "small handful" critique of "success" arguments for SR.
49. Fine's "Natural Ontological Attitude" (NOA) as neither realist nor anti-realist about science, in virtue of not adding any metaphysical account of truth to the "core position".
50. Musgrave on NOA as Scientific Realism in virtue of understanding truth "in the usual referential way" and as satisfying Tarski's Convention T.