

Philosophy 60
Introduction to Philosophy of Science

Stanford University, Fall Quarter 2021
Tues.-Thurs. 9:45 – 11:15

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I. DESCRIPTION:

For most of us, contemporary life would be unrecognizable without science and its technological offshoots. But what is science, and what, if anything, separates science from other forms of disciplined inquiry? Can there be necessary and sufficient conditions to distinguish science from non-science? Is this a distinction worth drawing? And if so, should science always strive to be value-free? What is scientific objectivity and how does it arise? How is scientific consensus formed or perhaps manufactured? Both philosophers and scientists have sought to address these, and related, questions with varying degrees of success. We'll examine these attempts as well the distinctive views about science they often presuppose concerning scientific rationality and method, the relation of models and theories to observation and evidence, the meaning of the 'objectivity' bestowed upon scientific knowledge claims, and whether science is capable of yielding mind-independent truths about entities, processes and structures in the world.

II. COURSE OBJECTIVES:

- to read and analyze contemporary literature in philosophy of science
- to think critically about claims regarding 'the nature of science'
- to write clear arguments in defense of your views about the knowledge science produces

III. PREREQUISITES:

There are no prerequisites. A previous course in analytic philosophy and/or elementary symbolic logic (first-order predicate calculus) will be useful but is not necessary.

IV. REQUIRED READINGS.

Available in paper editions at the Stanford Bookstore.

- 1) Thomas S. Kuhn, *The Structure of Scientific Revolutions*. Third ed. Chicago: University of Chicago Press, 1996 (First ed., 1962).
- 2) Richard Feynman, *The Character of Physical Law*. Cambridge, MA: MIT Press, 2017 (First ed., 1965).
- 3) Samir Okasha, *Philosophy of Science: Very Short Introduction*. Second ed. NY: Oxford University Press, 2016.

In addition to the above, readings (approx. 40 pages per week) are on the course Canvas site or from the online *Stanford Encyclopedia of Philosophy*.

V. FORMAT:

Each class meeting will comprise a 45-50 minute lecture, followed by discussion. All who attend should be prepared to actively participate and to respond to questions. Students are also expected to attend a **weekly discussion section**; section times to be determined in the first week of the term. No discussion sections meet in the first week.

VI. EVALUATION:

There are 4 components to your course evaluation.

- i) all students are expected to have read the weeks assigned readings prior to lecture. There are 8 short (250 words) weekly written papers to ensure students are engaging with readings and lectures, one due at the beginning of class on Tuesday in weeks 2 – 9. Not a précis or summary, these pass-fail assignments ask you to focus on, and critically respond to, one particular aspect of the topic discussed in a given reading.
- ii) two longer written essays (1250 words) on specific prompted topics. These provide an opportunity to learn to structure and write a brief philosophical paper; due at the beginning of class on Thursday of weeks 5 and 9.
- iii) one final prompted essay (1000 words) whose purpose is to synthetically present what you have learned; due on the scheduled final exam day for this course.
- iv) active participation in discussion section, in lecture and through office hours.

Final grade composition:

- i) [8 x 5% = 40%] + ii) [2 x 20% = 40%] + iii) [1 x 10%] + iv) [10%]

While you should make every effort to submit assignments on time, in view of inevitable schedule pressures, illness, or other reasons, students are allowed 3 default late excuses for listed assignments in i) and ii), each extending 48 hours from the due date.

VII. SPECIAL ACCOMMODATION:

Students requiring special accommodation on account of a documented disability (for example, regarding allowance of extra time to submit assignments) should direct a letter

from the Office of Accessible Education to Professor Ryckman setting out just what accommodation is required. This should be done by October 5th.

Students in Varsity Athletics whose event schedules may require them to miss a class, or section should provide Professor Ryckman the schedule by October 5th, accompanied by a supporting letter or the equivalent from their coach.

VIII. HONOR CODE:

1 The Stanford Honor Code is an undertaking of the students, individually and collectively: that they will not give or receive aid in examinations; that they will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading; that they will do their share and take an active part in seeing to it that others as well as themselves uphold the spirit and letter of the Honor Code.

2 The faculty on its part manifests its confidence in the honor of its students by refraining from proctoring examinations and from taking unusual and unreasonable precautions to prevent the forms of dishonesty mentioned above. The faculty will also avoid, as far as practicable, academic procedures that create temptations to violate the Honor Code.

3 While the faculty alone has the right and obligation to set academic requirements, the students and faculty will work together to establish optimal conditions for honorable academic work.

Violations of the Honor Code

Examples of conduct that have been regarded as being in violation of the Honor Code include:

- Unpermitted collaboration
- Plagiarism
- Representing as one's own work the work of another
- Giving or receiving aid on an academic assignment under circumstances in which a reasonable person should have known that such aid was not permitted.

IX. TOPICS and LECTURES:

Week 1 (Sept. 21 & 23): Introduction. What is Science? Science and Scientism.

-- readings: Okasha, ch. 1; Haack (2012) Weinberg (1994)

Week 2 (Sept. 28 & 30): Scientific method.

-- readings: Newton (1729); Mill (1872); Ayala (2009); Einstein (1933); Popper (1953)

Week 3 (Oct. 5 & 7): Two views of science:

-- part 1: selections from Feynman's *Character of Physical Law*.

Week 4 (Oct. 12 & 14): Two views of science:

-- part 2: selections from Kuhn's *Structure of Scientific Revolutions*; Okasha, ch. 5.

Week 5 (Oct. 19 & 21): Scientific progress. Objectivity and values in science.

-- readings: Laudan (1987); Weinberg (1993); Kuhn (1977); Megill (1994)

Week 6 (Oct. 26 & 28): First Essay Due at beginning of class, Oct. 28. Lectures by John Wilcox. Scientific confirmation.

-- required reading: Strevens (2017, sections 1-5); optional reading: Wilcox (2021a, 2021b, 2021c, 2021d)

The readings are accessible here: <https://www.johnwilcox.org/reading-guide-for-confirmation-lectures.html>

Week 7 (Nov. 2 & 4): Scientific explanation. Laws of nature.

-- readings: Okasha, ch. 3; Woodward & Ross (SEP); van Fraassen, selections from (1989; ch. 1-2)

Week 8 (Nov. 9 & 11): Lectures by John Wilcox. Theory choice. Underdetermination of theory by evidence.

-- required readings: Duhem (1914/53), Strevens (2017, section 10); optional reading: Lipton (1991) & (2000)

Week 9 (Nov. 16 & 18): Scientific realism, instrumentalism and non-realism

-- readings: Okasha, ch. 4; Psillos (2005) & (1996); van Fraassen (2001); Fine (1996)

Week 10 (Nov. 30 & Dec. 2): Summary and Conclusions. Open class discussion.