UNIVERSITY OF WARSAW

UNIVERSITY'S INTEGRATED DEVELOPMENT PROGRAMME

Course syllabus

Course title	Philosophy of science: an overview for cognitive science
Instructor(s)	Jeffrey Ketland Ph.D.
Contact details	j.ketland@uw.edu.pl
Affiliation	Faculty of Philosophy, University of Warsaw
Course format	seminar
Number of hours	30 hours
Number of ECTS credits	**3 ECTS credits** 24 hours: time spent in class 32 hours: preparation for classes (including obligatory reading assignment) 34 hours: preparation for in-class presentations and a short paper at the end of semester
Brief course description	The course provides an introduction to the philosophy of science understood as the examination of the most basic concepts and principles at work in scientific inquiry. The course concerns philosophical problems that arise in the sciences: identifying pseudo science, how claims are justified, the limits and styles of explanation and values in science. It is divided into four parts: i) nature of scientific knowledge, ii) scientific methods and theories iii) nature of scientific explanation, iv) science and its values.
Full course description	The course provides a basic introduction to the main philosophical questions concerning scientific knowledge and methodology. It surveys a variety of positions on standard philosophy of science topics, centered around four basic themes. 1. What is science and what is it not? We will explore what science is and to what extent it resembles or differs from other human activities and ways of knowing. We will tackle questions such as what makes science different from other human activities, what is the difference between science and pseudo-science, what is the difference between good science and bad science and whether there is any progress in science. 2. Scientific method and theories

We will consider what science do and tries to achieve and what is specific to the scientific method. We will try to give answers to the questions such as what makes a body of data evidence for or against a theory, what standards should be employed in choosing between alternative theories and how do observations relate to scientific theories more generally.

3. Scientific explanation, causation and laws of nature
We will focus on philosophical accounts of scientific explanation and try to characterize scientific explanation in general. In this module we will take a look at how science explains and what a good scientific explanation looks like.

4. Science and its values
This module is about what the interaction between our notion of what a scientific theory is supposed to do and moral and socio-political values. We will discuss issues concerning the responsibilities of scientists, the value of disagreement in science and the ideas of open science.

Learning outcomes

- Make use accurately of the terminology specific to philosophy of science (K_W08, K_U07)
- Identify philosophical issues about methods of science, including cognitive science (K_W01)
- Discuss orally and in writing central issues, concepts and arguments in philosophy of science (K_U01, K_U07)
- Recognize the philosophical issues specific to cognitive science and be able to evaluate the strengths and weakness of typical answers given to them (K_W01, K_U01
- Apply to the achievements in cognitive science the terminology and concepts of philosophy of science (K_W07, K_W08, K_U01)
- Evaluate the relevance of some arguments in philosophy of science (K_U01, K_U07)
- Compare and contrast alternative theories or approaches to scientific method and explanation (K_U01, K_U07)
- Understand moral responsibilities of a scientist (K_W10, K_W11, K_K02, K_K05, K_K06)

Learning activities and teaching methods

Group discussions: Students are expected to interact with instructor and classmates, elaborating on topics connected to the problems discussed in the obligatory reading.

Case studies: Students, either individually or in groups, will be provided with examples of various contemporary studies from the area of cognitive

sciences. Their task is then to analyse the case in terms of methodological and philosophical issues.

In-class presentation: At the start of the semester, students are expected to sign up for a presentation. Their task will be to prepare a ten minute introduction to the supplementary reading they present, briefly summarizing what they consider to be its focus, and highlighting issues it raised that they found particularly interesting, confusing or challenging.

Classroom exercises: short classroom exercises, oral (5 minute presentation maximum) or written (about 500 words maximum) where you apply knowledge you acquired to a concrete problem.

Text commentaries: before each meeting students are expected to answer two open questions concerning the issues discussed in the obligatory reading. It should be a motivation for the proper preparation for the in-class activities.

Short paper: on one from a range of topics that will be announced in class (1500–2000 words). The topics will concern methodological and philosophical issues of practices of contemporary science.

List of topics/classes and bibliography

I. What is science and what is it not?

- Carl Hempel (1966). “Philosophy of Natural Science”, 2.1-2.2 (3-9).
- Stephen S. Carey (2011). “Science,” from “A Beginner’s Guide to the Scientific Method” (1-7).
- Zoltan Dienes (2008), “Karl Popper and demarcation” from “Understanding psychology as a science: An introduction to scientific and statistical inference”. Macmillan International Higher Education (1-33).
- Walton T. Roth, Frank H. Wilhelm, Dean Pettit (2005). “Are current theories of panic falsifiable?”, Psychological Bulletin, 131(2), 171–192.

2. Scientific method and theories

- Peter Godfrey-Smith (2003). “Logic Plus Empiricism”, from “Theory and Reality: an Introduction to the Philosophy of Science” (19-38).
- Wesley C. Salmon (2002). "Bayes's Theorem and The History of Science", from Y. Balashov, A. Rosenberg, “Philosophy of Science: Contemporary Readings”, Routledge (385-402).
- Peter Lipton (2008). “Inference to the best explanation”, from S. Psillos, M. Curd (eds.), The Routledge Companion to Philosophy of Science (193-202).

- John P. A. Ioannidis (2005). "Why Most Published Research Findings Are False", PLoS Med 2(8): e124. https://doi.org/10.1371/journal.pmed. 0020124.
- Carl F. Craver (2001). "Structures of Scientific Theories" from P.K. Machamer and M. Silberstein (eds), "Blackwell Guide to the Philosophy of Science, Oxford: Blackwell.
- Thomas Kuhn (1962). Chapters 2-4 and 7-9, in The Structure of Scientific Revolutions, University of Chicago Press.

3. Scientific explanation, causation and laws of nature

- Wesley C. Salmon (1999). "Deductive-Nomological Model of Explanation", from Merrilee Salmon, et al. (eds.) "Introduction to the Philosophy of Science", Prentice Hall: New Jersey. (7-20)
- Peter Machamer, Lindley Darden, Carl F. Craver (2000). "Thinking about Mechanisms", Philosophy of Science, 67, 1–25.
- Carl F. Craver (2013). "Functions and mechanisms: A perspectivalist view", from P. Huneman (ed.), "Functions: Selection and mechanisms" Springer, Dordrecht. (133-158).
- Barbara Von Eckardt, Jeffrey S. Poland (2004). "Mechanism and Explanation in Cognitive Neuroscience", "Philosophy of Science, Vol. 71(5), 972-984.
- José Luis Bermúdez (2004). "Levels of psychological explanation and the interface problem" from "Philosophy of psychology: A contemporary introduction", Routledge (16-40).

4. Science and its values

- Douglas, Heather (2003). "The moral responsibilities of scientists (tensions between autonomy and responsibility)", American Philosophical Quarterly, 40, 59–68.
- N. L. Kerr (1998). "HARKing: Hypothesizing after the results are known", Personality and Social Psychology Review, 2(3), 196-217.
- Helen De Cruz, Jordan De Smedt (2013). "The value of epistemic disagreement in scientific practice. The case of Homo floresiensis", Studies in History and Philosophy of Science A, 44, 169–177.
- The Royal Society (2012). "Science as an open enterprise", ch. 1. The purpose and practice of science, ch. 3. The boundaries of openness, ch. 4. Realising an open data culture: management, responsibilities, tools and costs (13-23, 44-59, 60-79).

Assessment methods and criteria	Text commentaries graded on a two-point system (weighted 25%) In-class participation (weighted 35%) Short paper (weighted 40%) Bonus points (up to extra 20%) ● Classroom exercises ● In-class presentation

	Grading The minimum passing grade is 60%. 60% - 3 (sufficient) 68% - 3,5 (satisfactory) 74% - 4 (good) 82% - 4,5 (better than good) 90% - 5 (very good) 95% - 5! (excellent)
Attendance rules	Students may have two unexcused absences. If one or two additional excused absences occur, extra work may be done as a make-up. Failure to complete said work or more than two unexcused absences will result in failure to complete the class. Absence does not exempt a student from the work required for satisfactory completion of the course. Merely attending class does not constitute participation. To participate is to arrive at class punctually and to regularly contribute to collegiate discussion. Students' participation in class will be closely monitored throughout the semester.
Prerequisites	Basic knowledge of methodology of empirical or social sciences is required.
Academic honesty	Students must respect the principles of academic integrity. Cheating and plagiarism (including copying work from other students, internet or other sources) are serious violations that are punishable and instructors are required to report all cases to the administration.
Remarks	Any remarks you would like students to know