Course Code: PHIL 4183

Course Title: Philosophy of Science (科學哲學)

2016-17 Term 1

Instructor: Cheung, Kam Ching Leo (張錦青) (email: leokccheung@cuhk.edu.hk)

Tutor: TBA

Time / Venue (Lecture): Monday 10:30-12:15/ MMW 405

BLACKBOARD LEARN will be used for this course.

Course Description:

This course is an elementary, and yet comprehensive, introduction to philosophy of science. Philosophy of science is the branch of philosophy, which aims to study and investigate the nature and methodology of natural science in general. Although, strictly speaking, philosophy of science is different from the philosophy of a particular science like, for example, philosophy of physics, this course also attempts to provide philosophical reflections on certain basic concepts employed in physical sciences. The issues to be discussed in this course include theory and observation, natural laws, scientific explanation and prediction, induction, the demarcation between science and non-science, scientific change, realism and antirealism, causation and science, and space and time.

Learning outcomes:

After taking this course, students should able to:

- understand the basic concepts in philosophy of science.
- demonstrate familiarity with the major issues and prominent theses and positions in philosophy of science.
- appreciate the main concerns and the nature of the major issues in philosophy of science.
- acquire skills in argumentative discussion and in writing about issues in philosophy of science.
- enhance the ability of logical reasoning and argumentation and that of philosophy of science.

Learning activities:

Learning activities of this course include lectures, tutorials, reading essays, and writing a short essay and a term paper:

1. Lecture: 2 hours a week (mandatory).

2. Tutorial class: one two-hour session every two weeks (mandatory).

3. A short essay.

4. A term paper.

In this course, students are required to attend all the lectures and tutorials. Students are expected to read assigned essays before the lectures and study tutorial materials, consisting of assigned essays or book chapters, before the tutorial classes.

Students are also expected to devote sufficient time to the writing of a short essay and a term paper throughout the whole course. Surveying and reading the relevant literature and analyzing the materials are essential to the production of satisfactory short essay and term paper.

Students should be able to develop and enhance their analytical and argumentative skills through discussion in tutorials and classroom and writing the short essay and the term paper.

Assessment:

Tutorial performance	(20%)
Short essay	(20%)
Term Paper*	(60%)

Short essay: You need to write a short essay for this course. It would carry a maximum 20% of the mark of the course.

Word limit of the short essay: 1000-2000

Deadline for the short essay: TBA

A set of topics will be given to you three weeks before the deadline of the short essay.

Term paper:

Word limit of the term paper: 3000-5000

Deadline for term paper: TBA

Attention:
In your ***term paper and short essay***, if there are any ideas, opinions and/or materials which are taken from others, no matter whether you quote them word by word or not, you MUST provide the sources. Otherwise, you would be considered as having committed Plagiarism. (Please also refer to http://www.cuhk.edu.hk/policy/academichonesty/ for 'Honesty in Academic Work'.)

This only applies to the term paper: Students are required to submit their term papers to the **VeriGuide** system before handing them in. Please visit the following website for the VeriGuide system: http://veriguide1.cse.cuhk.edu.hk/portal/page/index.jsp

Outline Content:

1. Introduction—What is Philosophy of Science?

2. Scientific Explanation

3. Laws of Nature

4. The Problem of Induction

5. The Nature of Science
   - 5.1 Inductivism
   - 5.2 Popper's Falsificationism
   - 5.3 Scientific Revolution: Kuhn's Philosophy of Science
   - 5.4 Lakatos' Research Programmes
   - 5.5 Feyerabend's Theory of Anarchistic Knowledge

6. Realism and Antirealism

7. Measurement, Convention and the Empirical—Space and Time in Science

References (selected):

*Bird, Alexander. *Philosophy of Science*. London: UCL 1998.

*Bortolotti, L. *An Introduction to the Philosophy of Science*. Cambridge: Polity 2008.

Campbell, N. *What is Science?* NY: Dover 1953.

Carnap, R. *An Introduction to the Philosophy of Science*. NY: Dover 1995.

*Chalmers, A. F. *What is this Thing Called Science?* 3rd edition. Indianapolis: Hackett 1999.

*Curd, M. and Cover, J. A. (eds.) *Philosophy of Science*. NY: Norton 1998.

Feyerabend, P. *Against Method.* London: verso 1987.

*Hempel, C. G. *Philosophy of Natural Science*. New Jersey: Prentice Hall 1966.

*————. *Aspects of Scientific Explanation*. NY: Free Press 1970.

*Kuhn, T. S. *The Structure of Scientific Revolutions.* Chicago: U. of Chicago Press 1996.

*Ladyman, James. Understanding Philosophy of Science. London: Routledge 2002.

Lakatos, I. *The Methodology of Scientific Research Programmes*. J. Worrall and G. Currie (eds.). Cambridge: Cambridge U. Press 1978.

Lakatos, I and P. Feyerabend. *For and Against Method*. M. Motterlini (eds). Chicago: U. of Chicago Press 1999.

Nagel, E. *The Structure of Science*. NY: Harcourt 1961.

Newton-Smith, W. H. (ed.) *A Companion to the Philosophy of Science.* Oxford: Blackwell 2001.

Popper, K. R. *The Logic of Scientific Discovery.* London: Hutchinson 1980.

*————. *Conjectures and Refutations.* London: RKP 1989.

Quine, W. V. *From a Logical Point of View.* Cambridge: Harvard U. Press 1980.

*Rosenberg, A. *Philosophy of Science: A Contemporary Introduction.* London: Routledge 2005.

Salmon, W. *Scientific Explanation and the Causal Structure of the World*. Princeton: Princeton U. Press 1984.

*. I have reserved these books at the Library (with 2 hours loan period).

<u>List of articles for tutorial discussion</u>:

1. Kitcher, Philip, 'Explanatory Unification and the Causal Structure of the World' (excerpt), in P. Kitcher and W. Salmon (eds.), *Scientific Explanation*, Minneapolis: U. of Minnesota Press 1989.

2. Dretske, Fred I., 'Laws of Nature', in M. Curd and J. A. Cover (eds.), *Philosophy of Science*. NY: Norton 1998: 826-45.

3. <u>Essay 1</u>:

Strawson, Peter F., 'Dissolving the Problem of Induction', in B. A. Brody (ed.), *Readings in the Philosophy of Science*, NJ: Prentice Hall 1970: 590-6.

Essay 2:
Earman, John and Salmon, Wesley C., ''Part II: Hume's Problem of Induction', part of the essay 'The Confirmation of Scientific Hypotheses' in Merrilee H. Salmon, et al (eds.), *Introduction to the Philosophy of Science*, NJ: Prentice Hall 1991: 55-66.

4. McMullin, Ernan, 'Rationality and Paradigm Change', in M. Curd and J. A. Cover (eds.), *Philosophy of Science*. NY: Norton 1998: 119-38.

5. van Fraassen, Bas C., 'Arguments Concerning Scientific Realism', in M. Curd and J. A. Cover (eds.), *Philosophy of Science*. NY: Norton 1998: 1064-87.

Academic honesty and plagiarism:

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at http://www.cuhk.edu.hk/policy/academichonesty/ .

For assignments in the form of a computer-generated document that is principally text-based and submitted via VeriGuide, the statement, in the form of a receipt, will be issued by the system upon students' uploading of the soft copy of the assignment. Assignments without the receipt will not be graded by teachers. Only the final version of the assignment should be submitted via VeriGuide.