

**Lingnan University**  
**Department of Philosophy**

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| <b>Course Title</b>                | : Philosophy of Science                                                                       |
| <b>Course Code</b>                 | : PHI3368                                                                                     |
| <b>Recommended Study Year</b>      | : 3 <sup>rd</sup> Year                                                                        |
| <b>No. of Credits/Term</b>         | : 3                                                                                           |
| <b>Mode of Tuition</b>             | : Lecture and tutorial                                                                        |
| <b>Class Contact Hours</b>         | : 2 hours Lecture/week; 1 hour Tutorial/week                                                  |
| <b>Category in Major Programme</b> | : Programme Elective - Philosophy of Natural and Human Sciences Profile                       |
| <b>Prerequisite(s)</b>             | : PHI3101 Deductive Logic (Note: This prerequisite is waived for BAPAI Senior Year students.) |
| <b>Co-requisite(s)</b>             | : N/A                                                                                         |
| <b>Exclusion(s)</b>                | : N/A                                                                                         |
| <b>Exemption Requirement(s)</b>    | : N/A                                                                                         |

### **Brief Course Description**

The course will address a number of central topics of philosophy of science: the demarcation of science and pseudo-science, the nature of scientific explanation, prediction and inductive reasoning, the debate between scientific realists and instrumentalists. The students will be made acquainted with the views of some 20<sup>th</sup> century classics in philosophy of science (Popper, Quine, Hempel, Kuhn) as well as with the more recent developments in the field.

### **Aims**

To enable students to better understand the logic of scientific reasoning and thereby also put students in the position to make more informed decisions about controversial issues involving scientific claims and expert knowledge.

### **Learning Outcomes**

After completing this course, students will be able to:

1. describe problems in defining what science (or scientific method) is;
2. explain major approaches to the main issues in the philosophy of science;
3. critically evaluate philosophical theories; and
4. use what they learned in class to formulate and defend their own views on some controversial topic in the philosophy of science.

### **Indicative Content**

1. Science and pseudo-science and rationality  
Various proposals will be discussed about how to distinguish science from pseudo-science. In connection with this various theories of scientific rationality will be considered (Popper, Lakatos, Kuhn...) and how they can explain different historical episodes of scientific progress.
2. The nature of scientific explanation  
Carl Hempel defended the idea that scientific explanation should be understood as a kind of argument. He thought that to explain an event is just to show that it follows from some known facts (and laws). This view is still very influential, and it will be discussed in detail, together with some alternative suggestions (proposed by Kitcher, Salmon, Van Fraassen etc.).
3. Testing of scientific theories  
Good theories in science are supported by empirical evidence. But it is not easy to explain what this "empirical support" means, or under which conditions we want to say that a given hypothesis is "confirmed". Some solutions to this problem will be considered, and especially those relying on certain basic rules of probability.

#### 4. Scientific realism

Is it important for scientific theories to be true, or is it perhaps enough that they just correctly describe those things that we can observe? The first view is called “scientific realism”, and the second one is known as “instrumentalism”. The issue was famously debated in connection with Copernicus’ heliocentric theory, but it has also generated a fruitful controversy in contemporary philosophy of science.

### Teaching Method

Lecture and tutorial

### Measurement of Learning Outcomes

Students’ progress towards the learning outcomes will be measured by:

- (1) participation in tutorial discussions (LO1 and LO3)
- (2) in-class quizzes (LO2)
- (3) essays (LO2, LO3, and LO4)
- (4) final examination (LO1, LO2, and LO3)

### Assessment

30% Class participation, including discussions (15%) and in-class quizzes (15%)

30% Essay assignments

40% Final Examination

### Required Readings

Curd, M. & Cover, J. A., eds., *Philosophy of Science: The Central Issues*. New York: W. W. Norton, 1998.

### Supplementary Readings

Hacking, I., *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science*. Cambridge: Cambridge University Press, 1983. [Also available in Chinese in our library.]

Hempel, C. G., *Philosophy of Natural Science*. Englewood Cliffs, N. J.: Prentice-Hall, 1966. [Also available in Chinese in our library.]

Kuhn, T., *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press, 1970.

Papineau, D., ed., *The Philosophy of Science*. Oxford: Oxford University Press, 1996.

Popper, K. R., *The Logic of Scientific Discovery*. London: Hutchinson, 1959.

Rosenberg, A., *Philosophy of Science: A Contemporary Introduction*. New York: Routledge, 2000.

### Important Notes

- (1) Students are expected to spend a total of 9 hours (i.e. 3 hours of class contact and 6 hours of personal study) per week to achieve the course learning outcomes.
- (2) Students shall be aware of the University regulations about dishonest practice in course work, tests and examinations, and the possible consequences as stipulated in the Regulations Governing University Examinations and Course Work. In particular, plagiarism, being a kind of dishonest practice, is “the presentation of another person’s work without proper acknowledgement of the source, including exact phrases, or summarised ideas, or even footnotes/citations, whether protected by copyright or not, as the student’s own work”. Students are required to strictly follow university regulations governing academic integrity and honesty.
- (3) Students are required to submit writing assignment(s) using Turnitin.
- (4) To enhance students’ understanding of plagiarism, a mini-course “Online Tutorial on Plagiarism Awareness” is available on <https://pla.ln.edu.hk/>.

- (5) Students must adhere to the University's guidelines and practices when using Generative Artificial Intelligence (AI) tools. The official documents "Guidelines for Using GAI Tools at Lingnan University" and "Best Practices for Ethical and Responsible Use of GAI Tools in Course Assessments" can be found here: <https://www.ln.edu.hk/tlc/generative-artificial-intelligence/gai-guidelines-best-practices>.