

**DEREE COLLEGE SYLLABUS FOR: PH 3034 SCIENCE AND ITS METHODS: A
PHILOSOPHICAL EXPLORATION**

(Fall 2022)

**UK LEVEL L5
UK CREDITS: 15
US CREDITS: 3/0/3**

PREREQUISITES:

None

CATALOG DESCRIPTION:

A philosophical exploration of scientific methodology through actual cases in the history of science focusing on issues like the nature of scientific theories, the relation of evidence to hypothesis, the issue of theory choice and the universality of the scientific method.

RATIONALE:

This course is designed to integrate the sciences with the humanities, encouraging students to develop critical skills for understanding and evaluating the methods of various sciences. The course allows both concentration on central philosophical themes and diversification in terms of students' interests (astronomy, physics, chemistry, genetics, evolutionary biology, geology, psychology, sociology, and economics). Especially interesting for science and philosophy students.

LEARNING OUTCOMES:

- As a result of taking this course, the student should be able to:
1. Demonstrate understanding of philosophical concepts such as deduction, induction, confirmation, falsification, explanation, prediction, probability, theory, hypothesis, model, scientific law, universality of scientific method, scientific change.
 2. Examine philosophically primary texts from scientific literature.
 3. Critically evaluate different accounts of scientific method.

METHOD OF TEACHING AND LEARNING:

- In congruence with the learning and teaching strategy of the college, the following tools are used:
- Classes consist of lectures and interactive learning (class discussions of both primary and secondary sources).
 - Interpretation of the primary texts.
 - Office hours: Students are encouraged to make full use of the office hours of their lecturer, where they can discuss the course material.
 - Use of a Blackboard site, where lecturers can post lecture notes, research paper instructions, timely announcements, and additional resources.
 - Use of library facilities: Students are encouraged to make use of the library facilities for their research paper as well as for preparation for the final exam.

ASSESSMENT:

Summative:

First Assessment: Midterm examination	40%
Final Assessment: Research paper (2,500 words).	60%

	<p>Formative:</p> <table border="1" data-bbox="634 170 1377 241"> <tr> <td>Class presentation (individual or group)</td> <td>0%</td> </tr> <tr> <td></td> <td></td> </tr> </table> <p>The formative assessment aims at preparing students for their research paper. The first assessment tests Learning Outcome 1 The final assessment tests Learning Outcomes 2 and 3</p> <p>The final grade for this module will not be determined through grade averaging. Students are required to resit any failed assessments.</p>	Class presentation (individual or group)	0%		
Class presentation (individual or group)	0%				
<p>INDICATIVE READING:</p>	<p>REQUIRED READING:</p> <p>Gimbel, S., (ed.). <u>Exploring the Scientific Method: Cases and Questions</u>. London and Chicago. The Chicago University Press, 2011</p> <p>RECOMMENDED READING:</p> <p>Ladyman, J., <u>Understanding Philosophy of Science</u>. London and New York. Routledge, latest edition.</p> <p>McGrew, T., Alspector-Kelly, M., and Allhoff, F. <u>The Philosophy of Science. An Historical Anthology</u>. Wiley-Blackwell, latest edition.</p> <p>Brown, H. I. <u>Perception, Theory and Commitment: The New Philosophy of Science</u>. Chicago and London: The University of Chicago Press, latest edition.</p> <p>Kuhn, T. S. <u>The Structure of Scientific Revolutions</u>. University of Chicago Press, 1962.</p> <p>Losee, J. <u>A Historical Introduction to the Philosophy of Science</u>, Oxford University Press, latest edition.</p> <p>De Witt, Richard, <u>Worldviews. An Introduction to the History and Philosophy of Science</u>. Wiley-Blackwell, 2010.</p> <p><u>Criticism and the Growth of Knowledge</u>. Lakatos, I., and Musgrave, A., (eds.). Cambridge University Press, latest edition.</p> <p><u>Introduction to the Philosophy of Science</u>. Salmon, M. H. et al. (eds.). Englewood Cliffs, N J: Prentice-Hall, latest edition. Cambridge, 1970.</p> <p><u>The Philosophy of Science</u>. Boyd, R., Gasper, P., and Trout, J. D. (eds.) Cambridge, MA: MIT Press, latest edition.</p>				
<p>INDICATIVE MATERIAL: (e.g. audiovisual, digital material, etc.)</p>	<p>RECOMMENDED MATERIAL: <i>Philosophical Review</i> <i>Journal of Philosophy</i> <i>Nous</i></p>				

	<p><i>Mind</i> <i>Philosophy & Phenomenological Research</i> <i>Australasian Journal of Philosophy</i> <i>Philosophy of Science</i> <i>British Journal for the Philosophy of Science</i></p>
COMMUNICATION REQUIREMENTS:	Research paper submitted in Microsoft Word. Class discussions require academic/ professional English and debating speech skills.
SOFTWARE REQUIREMENTS:	Microsoft Word
WWW RESOURCES:	<p>http://plato.stanford.edu/ http://www.utm.edu/research/iep http://philsci-archive.pitt.edu/</p>
INDICATIVE CONTENT	<ol style="list-style-type: none"> 1. Deductivism <ol style="list-style-type: none"> 1.1. Aristotle 1.2. Descartes 1.3. Hempel's deductive-nomological explanation. 1.4. Causal explanations 2. Inductivism <ol style="list-style-type: none"> 2.1. Bacon 2.2. Newton 2.3. Mill 3. Probability <ol style="list-style-type: none"> 3.1. Mathematical probability 3.2. Physical probability 3.3. Inductive probability 3.4. Hempel's inductive-statistical explanation 4. Confirmation <ol style="list-style-type: none"> 4.1. Hypothetico – deductivism 4.2. Paradoxes of confirmation 4.3. Bayesian confirmation theory 5. Falsificationism 6. Holistic views of scientific theories and scientific methodology. <ol style="list-style-type: none"> 6.1. Duhem 6.2. Kuhn 6.3. Lakatos 7. Semantic views of scientific theories <ol style="list-style-type: none"> 7.1. Models in science 8. Critical views: on the universality of scientific method <ol style="list-style-type: none"> 1. Feyerabend: there is no scientific method 2. Latour: scientific facts are social constructs