PHILOSOPHY OF SCIENCE (HONOURS) (PHIL10149)

COURSE ORGANISER: Dr. Jamie Collin (james.collin@ed.ac.uk)

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SEMINAR TIME AND LOCATION: 16:10–18:00, 7 George Square, S1.

TUTORIAL TIMES AND LOCATIONS: TBC

COURSE AIMS AND OBJECTIVES

This is a level 10 course aimed at 3rd-year students covering key topics in contemporary philosophy of science, including: scientific expertise, laws of nature, logical positivism, Bayesian confirmation theory, scientific modelling and representation, measurement, scientific explanation, scientific realism, and postmodern understandings of science.

LEARNING OUTCOMES

On completion of this course, the student will be able to:

1. To provide students with a well rounded view of central issues in Philosophy of Science, and to expand their knowledge beyond the set pre-Honour course.
2. To enhance their communication skills by developing pedagogical materials on assigned readings (which will be marked as the class participation part of the assessment for this course).

REQUIREMENTS AND ASSESSMENTS

This course will be assessed through class participation (10%), a mid-term essay of 1,500 words (40%), and an end-of-semester essay of 2,000 words (50%).
READINGS

In completing this course you will learn to become effective researchers. To this end, while we supply readings each week, it's up to you to conduct your own research and seek out further secondary sources that will aid you in understanding these difficult topics. Three sources may be particularly useful:

The Internet Encyclopedia of Philosophy.

This provides introductory encyclopaedia articles, written by experts, on many topics in philosophy. As well as providing a useful introduction to the topics at hand, the readings lists at the bottom of each article can be used to guide further research. The IEP is freely accessible online.

The Stanford Encyclopedia of Philosophy.

Like the IEP, the SEP also provides encyclopaedia articles, written by experts, on many topics in philosophy. These tend to be slightly longer and more detailed, but also more difficult, than IEP entries. As before, the reference list at the bottom of each article can be used to guide further research. The SEP is freely accessible online.

Oxford Bibliographies

Oxford Bibliographies provides research guides in the form of annotated bibliographies compiled by experts in their given field. This is available online through the library tab in MyEd.

SYLLABUS

Week 1 | Scientific expertise, testimony, and trust

Scientific practice requires trusting the testimony of other scientists, for instance in believing that the results published in scientific journals are being truthfully reported. Moreover, public and private institutions rely on the testimony of scientific experts in myriad ways. This raises a number of epistemological questions – What makes someone an expert? Are there reliable ways that laypeople can differentiate between genuine and mere
purported experts? Are there any occasions where we are warranted in not believing expert testimony? – which are explored here.

Essential reading:


Further reading:


Week 2 | Laws of nature (part I)

The Scientific Revolution – and the new mathematical means of representing the physical world that precipitated it – fundamentally altered the way we understand reality. The Aristotelian picture which had been dominant for two millennia was overthrown, with ripple-out implications for much philosophical thought. Here we consider this transition, as well as contemporary and scientifically-informed revivals of Aristotelian metaphysical ideas.

Essential reading:


*Further reading:*


### Week 3 | Laws of nature (part II)

Since at least the time of David Hume, some empiricist philosophers have criticized both the idea that we could know the behaviour of the physical world was governed by causal powers or natural laws, and the very intelligibility of the concepts of causation and natural necessity. This week we examine arguments for and against empiricism.

*Essential reading:*


*Further reading:*


### Week 4 | Logical Positivism
Logical positivism – partly inspired by Humean empiricist scruples – was perhaps the dominant philosophical movement in the early 20th century. The logical positivists were technically sophisticated and scientifically informed, drawing on recent developments in the foundations of mathematics and in physics to expound a view of philosophy that attempted to do these things justice. The result was a dramatic rethinking of philosophy in terms of ‘language management’ and a rejection of traditional metaphysical questions. Logical positivism has since fallen largely out of favour with the philosophical world, but is also winning new adherents. In this lecture we consider the motivations for logical positivism, the character of logical positivism, and the status of positivism today.

Essential reading:


Further reading:


Week 5 | Bayesian Confirmation Theory

While scientific theories cannot generally be proven – in the strong, mathematical sense – some are well confirmed by evidence (setting aside radical skepticism), while others are not. What it means to be confirmed by evidence is a tricky philosophical question, as attested to
by the history of failed theories of scientific confirmation. Bayesian confirmation theory avoids many of these pitfalls, but raises questions of its own, discussed in this week.

**Essential reading:**


**Further reading:**


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**Week 6 | Scientific Modelling and Representation**

Scientific modelling is central to many areas of science, but raises many philosophical questions. How can looking at one thing (the model) tell us about something else (the world)? More generally, what is required for scientific representation (and representation simpliciter)? How do idealisations function in models? How can a deliberately inaccurate model of the world represent and explain features of reality?

**Essential reading:**


**Further reading:**
Week 7 | Measurement

Measurement is the mysterious process by which it becomes possible to represent physical systems mathematically. Without measurement, science would be impossible, but measurement is the source of a number of philosophical puzzles. For instance, measurement seems to involve a kind of circularity: measurements are only meaningful in the context of an antecedent theory, but are also supposed to lend empirical support to theories. The philosophy of measurement also interacts with the issues surrounding scientific realism in deep and illuminating ways.
Week 8 | Scientific Explanation

As with the notion of confirmation, the history of the philosophy of science is replete with failed attempts to analyse scientific explanation. Here we explore why deductive-nomological and inductive-statistical accounts of scientific explanation are now widely rejected, and ask whether accounts of scientific explanation in terms of causation or unification fare any better.

Essential reading:

Further reading:


**Week 9 | Scientific realism**

According to scientific realism, our best science aims at giving us (and succeeds in giving us) accurate descriptions of both the observable and the unobservable world. This week we focus on what is often taken to be the foremost argument for scientific realism: the ‘no miracles’ argument, which centres around the thought that the predictive success of our best scientific theories would be a ‘miracle’ if they were not at least approximately true. We consider the argument and recent objections to it.

Essential reading:


Further reading:


**Week 10 | Science and postmodernism**

Kuhn’s famous historical-philosophical work on the development of science combined with Kantian anti-realist ideas (via the logical positivists) to produce ‘postmodern’ understandings of science. These typically asserted that epistemic norms (standards of justification, confirmation etc.) are relative rather than objective, and that the facts uncovered by science are socially constructed rather than mind-independent or objectively “out there” in the world to be found. This week we explore the roots of postmodernism and the arguments both for and against it.

*Essential reading:*


*Further reading:*


**Week 11 | Review Week**

*No set reading.*