

# Philosophy of Science 1 (PHIL08005)

19/20

Semester 1

This course introduces students to major topics in philosophy of science, aiming to address the central question: "What makes science special?"

## Course Organiser / Lecturer:

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## Lecturer:

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## Course Secretary:

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UG Teaching Office, G.06 Dugald Stewart Building

## Lecture Times and Location

Monday	17:10 – 18:00	Appleton Tower, Lecture Theatre 1
Tuesday	17:10 – 18:00	Appleton Tower, Lecture Theatre 1
Friday	11:10 – 12:00	Appleton Tower, Lecture Theatre 1

## Lecture Topics and Readings

### Week 1: Historical Background

#### Recommended Reading:

Descartes, Rene (1998) "Rules for the Direction of our Native Intelligence" in *Selected Philosophical Writings*, ed. and trans. John Cottingham and Robert Stoothoff, pp. 1–19

Bacon, Francis (2000) *The New Organon*, ed. Lisa Jardine and Michael Silverthorne, Cambridge UP. Bk 1, Aphorisms I–X, XVIII–XXIV, XXXVIII–XLVI, L, CV–CVI. In this edition, pp. 33, 34, 36, 37, 40–43, 45, 83, 84.

### Week 2: The Problem of Induction

#### Essential Reading:

Bortolotti, Lisa (2008) *An Introduction to the Philosophy of Science*, Chapter 2  
“Reasoning,” pp 30–52.

**Recommended Reading:**

Hume, David (1739 / 1888) *Treatise of Human Nature* (ed. Selby-Biggs) Book 1, part 3, sec. 6.

**Week 3: Logical Empiricism**

**Essential Readings:**

Godfrey-Smith, Peter (2003) *Theory and Reality*, Chapter 2: “Logic plus empiricism,” pp. 19–38.

Hempel, Carl (1962) “Two Basic Types of Scientific Explanation” in (Curd & Cover, eds.) *Philosophy of Science: The Central Issues*, pp. 685–719.

**Recommended Reading:**

Stanford Encyclopedia Article: <https://plato.stanford.edu/entries/logical-empiricism/>

**Week 4: Kuhn: Revolutions and Progress**

**Essential Reading**

Kuhn, Thomas S. (1970) *The Structure of Scientific Revolutions*, 2<sup>nd</sup> ed. Chapter 1: “A Role for History” pp. 1–9.

Kuhn, Thomas S. (1977) “Objectivity, Value Judgment, and Theory Choice,” in *The Essential Tension*, pp. 320–339.

**Recommended Reading**

Kuhn, Thomas S. (1970) *The Structure of Scientific Revolutions*, 2<sup>nd</sup> ed. Chapter 9  
“The Nature and Necessity of Scientific Revolutions,” pp. 92–110.

Ladyman, James (2002) *Understanding Philosophy of Science*, Chapter 3  
“Falsificationism,” pp 62–92.

Popper, K. R. (1959) *The Logic of Scientific Discovery*, Ch. 1, “A Survey of Some Fundamental Problems,” Routledge, pp 3–26.

**Week 5: Values in Science**

**Essential Reading:**

Longino, Helen (1995) “Gender, Politics, and the Theoretical Virtues,” *Synthese* 104: 383–397.

Kourany, Janet A. (2003) “A Philosophy of Science for the Twenty-First Century” *Philosophy of Science* 70(1): 1–14.

**Recommended Reading:**

Rogers, Wendy (2004) "Evidence-Based Medicine and Women: Do the Principles and Practice of EBM Further Women's Health?" *Bioethics* 18: 50–71.

Worrall, John (2007) "Evidence in Medicine and Evidence Based Medicine," *Philosophy Compass* 2/6: 981–1022.

## Week 6: Realism

### Essential Reading:

Hilary Putnam (1978) "What is realism?" in *Meaning and the Moral Sciences* (London: Routledge). Up until start of "Mathematical Intuitionism" section ONLY

Bas van Fraassen "Arguments concerning scientific realism," ch. 2 of *The Scientific Image* (1980), Clarendon Press. Reprinted in Curd and Cover, pp. 1064-1087.

### Recommended reading

Feyerabend, Paul (1975) "How to Defend Society Against Science," *Radical Philosophy* 11: 3–8.

Ian Hacking "Experimentation and scientific realism," *Philosophical Topics* 13 (1982), pp. 154-72. Reprinted in Curd and Cover, pp. 1153-1168.

Ladyman, J., 1998. "What is structural realism?" *Studies in History and Philosophy of Science*, 29: 409–424.

## Week 7: Models

### Essential Reading:

Weisberg, Michael (2007) "Who is a Modeler?" *British Journal for the Philosophy of Science* 58(2): 207–233.

Angela Potochnik (2012). "Feminist Implications of Model-Based Science." *Studies in History and Philosophy of Science Part A* 43 (2):383-389.

### Recommended Reading:

Parker, Wendy (2011) "When Climate Models Agree: The Significance of Robust Model Predictions," *Philosophy of Science* 78(4): 579–600.

Morrison, Margaret and Mary S. Morgan (1999) "Models as Mediating Instruments," Ch. 2 of *Models as Mediators*, ed. Morrison and Morgan. Cambridge UP, 10–37.

Lloyd, Elisabeth (2010) "Confirmation and Robustness of Climate Models," *Philosophy of Science* 77(5): 971–984.

## Week 8: Explanation & Understanding

### Essential Reading

Cartwright, Nancy (2004) "From Causation to Explanation and Back," in Leiter B, ed. *The Future for Philosophy*. OUP, pp. 230–45.

Reutlinger, Alexander (2017) "Explanation beyond causation? New directions in the philosophy of scientific explanation," *Philosophy Compass* 12:e12395.

### **Recommended reading**

Jansson, Lina & Saatsi, Juha (2016). "Explanatory Abstractions," *British Journal for the Philosophy of Science*:axx016.

Alexander, Reutlinger & Holly, Andersen (2016). "Abstract versus Causal Explanations?" *International Studies in the Philosophy of Science* 30 (2):129-146.

## **Week 9: Laws & Causality**

### **Essential reading**

Bird, Alexander (1998) *Philosophy of Science*, Chapter 1: "Laws of nature"

Beebe, Helen (2000) "The non-governing conception of laws," *Philosophical and Phenomenological Research* 61 (3):571-594.

### **Recommended reading**

Cartwright, Nancy (1979) "Causal laws and effective strategies," *Noûs* 13 (4): 419-437.

Hall, Ned (2004) "Two concepts of causation" In John Collins, Ned Hall & Laurie Paul (eds.), *Causation and Counterfactuals*. MIT Press. pp. 225-276

## **Week 10: Reduction & Emergence**

### **Essential reading**

Nagel, Ernest (1970) "Issues in the Logic of Reductive Explanations" in (2008) *Emergence: Contemporary Readings in Philosophy and Science*, ed. Bedau and Humphreys

Kaiser, Marie I. (2012) "Why it is Time to Move Beyond Nagelian Reduction," in *Probability, Laws, and Structures*, ed. Dieks, Gonzalez, Hartmann, Stöltzner, and Weber. pp. 245–262.

### **Recommended reading**

Mitchell, Sandra (2012) "Emergence: Logical, Functional and Dynamical," *Synthese* 185: 171–186.

## **Week 11: Review**

Lecture notes and other materials will be available on [Learn](#).

## Further advice on Readings

Encyclopaedias are a very good source of extra reading. Avoid Wikipedia (it is often inaccurate on philosophy) but there are good internet encyclopaedias that can be useful:

[The Stanford Encyclopedia of Philosophy](#) (SEP)

[The Internet Encyclopedia of Philosophy](#) (IEP)

## Websites

We also recommend the following as starting points for your research:

[PhilPapers](#)

[Philosophy Compass](#)

[The Diversity Reading List](#)

You will need to know how to track down sources, including electronic journals, using the library search engine [DiscoverED](#).

## Tutorials

In addition to three course lectures per week, you will have weekly tutorials. These give you a chance to further discuss topics and issues in the course and its lectures. Tutorials will take place, at times and places to be arranged, during weeks 2 through 11 of the semester.

Attendance at tutorials is compulsory for all students on this course. The class tutor will maintain a register of attendance. Unexplained absences will be brought to the attention of your Personal Tutor.

You will be allocated a suitable tutorial group by the Timetabling Department based on your timetable. Should you wish to change the group you have been allocated to, you will need to fill in the *Group Change Request Form* on the Timetabling Department's webpage. This form will be open until the end of Week 3 – if you wish to change groups after this time please contact the Teaching Office directly ([philinfo@ed.ac.uk](mailto:philinfo@ed.ac.uk)).

Please inform your tutor and the Teaching Office of any absences. Students who miss tutorials may be required to do additional written work.

## Assessment

This course is assessed by a 1500 word midterm essay (25%) and an end of semester exam (75%).

### Mid-term essay

The deadline for the midterm essay is by **12pm (mid-day), Wednesday 30<sup>th</sup> October**.

You should submit your essay via Turnitin on the Learn page. Please contact the Course Secretary if you are having problems uploading your essay.

The word count of your essay, including footnotes but excluding bibliography, must not exceed the specified word limit. The precise word count must be written on the coversheet. Overlong essays will be penalised according to the following rule: 1% of the maximum obtainable mark will be deducted for every 100 words, or part thereof, over the word limit. So, exceeding the word limit by 1-100 words incurs a deduction of 1%; exceeding by 101-200 words incurs a deduction of 2%; and so on.

### End of semester exam

The Semester 1 exam diet takes place from 9<sup>th</sup> – 20<sup>th</sup> December (including Saturday 14<sup>th</sup> December) and it is the student's responsibility to ensure they are available for the whole of the exam diet.

Exact details of the date, time and location of the exam will be announced later in the semester.

### Resit

The resit takes place in May and is 100% exam. It is the student's responsibility to check the resit timetable on the University website, find the time and location of the resit exam and ensure they are present for that resit. No formal registration is necessary and students will not be individually notified of the resit date and location of resit exams.

### Visiting undergraduates

The assessment arrangements for visiting undergraduates are the same as for other students.

### Mark Schemes

For Philosophy-specific marking guidelines go here:

[Grade-related marking guidelines for Philosophy](#)

For the University's general marking scheme go here:

[Common Marking Scheme](#)

### Learning Resources

#### Learn

You should regularly check your university email and check for announcements on the course *Learn* page.

The course *Learn* page will provide information concerning:

- General information and announcement about the course
- Lecture notes and slides

- Tutorial arrangements
- Information about assessment arrangements

### University of Edinburgh Library

The library's hard-copy and online resources can be searched online via *DiscoverEd*.

### Exemplar essays

Anonymised exemplar essays will be on the Learn pages. These are essays written by past students that they have kindly agreed for us to use. We encourage you to read these essays in conjunction with the Philosophy-specific marking guidelines. In doing so think about the strengths and weaknesses of the essay, why the essays fell into their grade-band, and how they could have been improved.

There are many ways for an essay to fall into a particular grade-band. The Philosophy-specific marking guidelines provide explanation of the many, diverse, ways in which an essay can be a 1st, 2.i, 2.ii, and so on. The exemplar essays only show one way to achieve a certain grade; it is not the only way.

### Autonomous Learning Groups

Each course has dedicated Autonomous Learning Groups. It is up to you, the members of the ALG, to organise the meetings. You decide how often to meet and what to do in your ALG. ALGs are designed to help you learn and get to know your classmates; they are not a formal requirement of the course. It is important to note that assessment in your courses is non-competitive: you aren't competing against your classmates, only against the general grade criteria. It is in your interests to help each other.

You could use ALG meetings to:

- Read and discuss the papers together
- Discuss essay-writing and time-management techniques
- Constructively critique draft essays or plans
- Work on presentations or discussion posts that the class may involve
- Share tips on career advice

Please email the Course Organiser if you feel that it would be useful for the group if they joined one of your sessions. Please contact the course secretary if you find it necessary during the semester to transfer into a different group.

### Getting in Touch

If you have a question regarding lecture content you should ask it in your tutorial group and/or visit the relevant lecturer to discuss it during their office hour.

For other specifically academic matters, you can contact the Course Organiser.

If you have questions not specifically about lecture content, you should contact the Course Secretary.

## **Prizes**

Students who excel in Philosophy of Science may be eligible for the Daniel Garrad Prize.

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