

# **Philosophy and Methodology of the Natural and Social Sciences**

## **Course Syllabus**

Lecturer: Alexander Koryagin

Class Teacher: Alexander Koryagin

### **Course Description**

Philosophy and Methodology of the Natural and Social Sciences is a one semester course for second year ICEF students. The course provides a broad introduction to the main themes and issues in the philosophy of science in general and the philosophy of social science in particular. It is principally concerned with the epistemological, logical, metaphysical and ethical underpinnings of scientific methodology. Fundamental philosophical questions are presented with a view to demonstrating how they are relevant to and how they inform scientific inquiry. The course explores topics such as, among others, the possibility of knowledge, the distinctiveness of science, the logic of scientific method, scientific explanation, whether science describes reality or not, whether social science should be based on the methods of natural science, the nature of practical rationality, the place of ethical values in relation to science, and critiques of scientific rationality. All topics are presented as problems and areas of dispute.

### **Course Objectives**

Aside from providing an introduction to the principal questions explored by the philosophy of science and social science, the course aims to cultivate in students a critical awareness of the assumptions and conditions that lie behind scientific theories and arguments. Upon successful completion of the course, students should be able to analyse and judge the validity of an argument, construct extended coherent arguments that engage critically with the existing philosophical literature, apply and connect philosophical arguments to pertinent issues in the sciences (particularly in those disciplines that they are currently studying) and use the conceptual resource provided by the course to think logically, critically and independently. The particular content of the course is relevant to scientific study in general and the skills that the course develops are transferable and widely applicable in academic and professional life. The educational ethos of the course is to contribute to the development of the students' faculty of autonomous critical reasoning rather than the robotic repetition of given information.

### **Methods**

The methods and forms of study used on this course include lectures, seminars, teachers' consultations and students' own self-study. There is one weekly lecture and one weekly seminar. Each seminar is based on the contents of the preceding lecture. Seminar discussions encourage students to actively engage with the ideas presented in the lectures, a process that should clarify and deepen their understanding of the issues. Students must do a set preparatory reading before participating in a seminar.

The forms of assessment used on the course include an essay, a presentation, a mark for seminar participation, and an end-of-course exam (a three-hour written examination).

## Main Reading

1. Godfrey-Smith, P., *Theory and Reality: an Introduction to the Philosophy of Science*, (Chicago: The University of Chicago Press, 2003).
2. Hollis, M., *The Philosophy of Social Science: an Introduction*, (Cambridge: Cambridge University Press, 1994).
3. Ladyman, J., *Understanding the Philosophy of Science*, (London: Routledge, 2002).
4. Massimi, M. (ed.), *Philosophy and the Sciences for Everyone*, (London: Routledge, 2015).
5. Turner, S. P. and Roth, P. A. (eds.), *The Blackwell Guide to the Philosophy of Social Science*, (Oxford: Blackwell, 2003).

## Supplementary Reading

- i. Bourdieu, P., 'The Scholastic Point of View' in *Cultural Anthropology Vol. 5, No. 4 (Nov., 1990)*, pp. 380-391.
- ii. Foucault, M., *The Hermeneutics of the Subject*, (New York: Picador, 2005).
- iii. Fukuyama, F., *The Origins of Political Order*, (New York: Farrar, Straus and Giroux, 2011).
- iv. Gutting, G., *The Cambridge companion to Foucault*, (Cambridge: Cambridge University Press, 2006).
- v. Harris, M. and Pritchard, D. (eds.), *Philosophy, Science and Religion for Everyone*, (London: Routledge, 2018).
- vi. Hawking S. and Mlodinow L., *The Grand Design*, (London: Bantam Books, 2011).
- vii. Hodge, J. and Radick, G. (eds.), *The Cambridge Companion to Darwin*, (Cambridge: Cambridge University Press, 2009).
- viii. Kahneman, D., *Thinking, Fast and Slow*, (New York: Farrar, Straus and Giroux, 2011).
- ix. Losee, J., *A Historical Introduction to the Philosophy of Science*, (Oxford: Oxford University Press, 2001).
- x. Machamer, P. and Silberstein, M. (eds.), *The Blackwell Guide to the Philosophy of Science*, (Oxford: Blackwell, 2002).
- xi. Magee, B., *The Great Philosophers*, (Oxford: Oxford University Press, 1987).
- xii. Psillos, S., *Philosophy of Science A – Z*, (Edinburgh: Edinburgh University Press, 2007).
- xiii. Richards, J., *Human nature after Darwin*, (London: Routledge, 2000).
- xiv. *Routledge Encyclopedia of Philosophy: Philosophy of Science*, (London: Routledge, 1998).
- xv. Stearns, S., 'Are we stalled part way through a major evolutionary transition from individual to group?' in *Evolution Volume 61, Issue 10 (October 2007)*, pp. 2275–2280.

## Internet Resources

- Stanford Encyclopedia of Philosophy (SEP): <http://plato.stanford.edu/>
- Internet Encyclopedia of Philosophy (IEP): <http://www.iep.utm.edu/>
- Edinburgh Philosophy of Physical and Cognitive Sciences:  
<https://www.coursera.org/learn/philosophy-physical-sciences>  
<https://www.coursera.org/learn/philosophy-cognitive-sciences>

## Grade Determination

The final grade consists of the following four components:

- Exam 60%
- Individual Project (essay and oral presentation) 20%
- Seminar participation (including written assignments) 20%

Note: in order to get full marks for the seminar participation students need to actively participate in the class discussions, to demonstrate familiarity with assigned readings and lecture material, including being prepared to answer the questions that the class teacher may pose; as well as to complete the occasional short written assignments.

## Course Outline

### 1. Introduction: what is the philosophy of science

Course outline, main topics, ground rules, assessment. What is knowledge? The challenge of scepticism. The relationship between philosophy and science.

*(No assignment)*

## PART I: Epistemological Foundations of the Scientific Methodology

### 2. Foundations of modern epistemology: Hume and Kant

What is science? Difference between ancient and modern science. The scientific revolution. Bacon and Descartes. Rationalist, empiricist and constructivist approaches to epistemology. Analytic-synthetic distinction. Hume on the problem of induction. Kant's Copernican revolution, phenomena and noumena.

*(Hawking 2011, pp. 21-49; Magee, pp.144-186)*

### 3. Logical positivism and Popper's falsificationism

The logical positivist project: verifiability criterion of meaning, protocol sentences, unity of science, physicalism, reductionism, logical foundations of mathematics. Popper: falsifiability criterion, context of discovery and context of justification. Hypothetico-deductive method. The use of observations, theories, models and axioms. Problem of demarcation. The problem of method. The problem of unobservables and bridge principles. Case study: Higgs boson, dark matter and dark energy.

*(Godfrey-Smith, pp. 19-37; Hollis, pp. 66-77)*

### 4. Quine and Kuhn on anti-foundationalism

Foundationalism and anti-foundationalism. Wittgenstein on language games. Quine: ‘two dogmas of empiricism’, holism about testing, rejection of analytic-synthetic distinction, web of belief, conceptual scheme, theory-ladenness of observation, underdetermination, epistemological naturalism. Kuhn: paradigm shifts, institutional and conceptual aspects of paradigms, normal/revolutionary science, incommensurability. Pragmatist epistemology.

*(Hollis, pp. 77-91; Psillos pp. 71-72)*

## **PART II: Theorising human action**

### **5. Phenomenology, hermeneutics and psychoanalysis**

The unity of science and the specificity of the social. Positivist and Interpretivist approaches: explanation versus understanding, causes and reasons. The role of consciousness and deliberate decision making in describing everyday human life. Husserl’s completion of the Cartesian view of the subject. Freud: psyche as an energy system, id-ego-superego model, libido and thanatos, pleasure and reality principles, the problem of the unconscious. Heidegger: critique of solipsism, ontologisation of the hermeneutic circle, temporal structure of being, prejudice, epochs, the problem of technology.

*(Magee pp. 252-276; IEP)*

### **6. Evolutionary and functional explanations in the social sciences I-II**

Mechanistic and teleological forms of explanation. Physicalist reductionism and the unity of science. The logic of evolutionary explanation: proximate (synchronic) and ultimate (diachronic) causation. Methodological individualism versus holism. The concept of adaptation. Dennett on cranes and skyhooks. Levels and units of selection. Evolutionary psychology and sociobiology. Cultural evolution and group selection. ‘Memes’ and ‘genes’ analogy. Fukuyama on human nature, ‘the state of nature’, and the origins and development of political order.

*(Richards, pp. 4-24; Stearns, pp. 2275–2280)*

### **7. Rational agency I-II**

Evolutionary psychology of rationality and emotion. Pleasure and satisfaction. Conscious self and the modular theory of the mind. Bounded rationality. Dual process theory: unconscious processing, associative thinking, perceptual illusions, heuristics and biases. Experiencing and remembering self.

*(Kahneman, pp. 19-29, 50-59, 377-385; Hodge and Radick, pp. 393-410)*

### **8. Essays and presentations week**

Guidelines for writing a proper academic essay. Style, structure, formatting, references and bibliography.

*(Classes will be devoted to student presentations)*

## **PART III: The limits of scientific rationality**

### **9. Power, knowledge and the self**

Foucault on sovereign, disciplinary and bio-power. Power/knowledge, discourse, panopticon, normalising judgement, governmentality. Sciences as vehicles of power. Hermeneutics of the subject and eudaemonia.

*(Gutting 2006, pp. 95-102; Foucault, pp. 491-505)*

### **10. The limits of scientific rationality**

The possibility of value-neutral science. Bourdieu on the ‘scholastic point of view’. Derrida on logocentrism. Lyotard on meta-narratives and incommensurable language-games. Feyerabend’s epistemological anarchism. Paradoxes and paraconsistent logic.

*(Godfrey-Smith, pp.110-117; REP, pp.172-175; Bourdieu, pp. 380-389)*

### **11. Consciousness and free will**

Naturalistic accounts of human nature and behaviour. Mind-brain interaction, hard problem of consciousness. Free will and determinism, compatibilism.

*(Machamer and Silberstein, pp.93-98, 272-287; Psillos, 531-541; SEP; IEP)*

### **12. Revision**

*(no assignment)*

## **Distribution of hours for topics and types of work**

No	Topic	Total	Lectures	Classes	Self-study
1.	What is the philosophy of science	8	2	2	4
2.	Foundations of modern epistemology	8	2	2	4
3.	Logical positivism and Popper’s falsificationism	16	4	4	8
4.	Quine and Kuhn on anti-foundationalism	8	2	2	4
5.	Phenomenology, hermeneutics and psychoanalysis	16	4	4	8
6.	Evolutionary and functional explanations in the social sciences	16	4	4	8
7.	Rational agency	16	4	4	8
8.	Essays and presentations	8	2	2	4
9.	Power, knowledge and the self	8	2	2	4
10.	The limits of scientific rationality	8	2	2	4
11.	Consciousness and free will	8	2	2	4
12.	Revision	8	2	2	4
	Total	128	32	32	64