

Syllabus, PHIL*2180
Philosophy of Science
Fall 2015

Instructor

Dr. Stefan Linquist

Office: MacKinnon (office building) 358

Hours: Tuesday: 2:00- 3:00 (or email for appointment)

Email: linquist@uoguelph.ca

Website: www.biophilosophy.ca

Lecture

Tuesday & Thursday

11:30- 12:50

Mackinnon 224

Course Description and Learning Objectives

Over the past three centuries, science has gradually overtaken religion as the dominant source of knowledge about nature—including human nature. Naturally, there are lingering questions about the limits of scientific explanation and whether it deserves its place of authority in contemporary society. But before one can address those issues, it is important to understand how science has managed to attain its current level of success. You might answer, “because science makes successful predictions,” or, “because science leads to the production of fancy gadgets like my iPhone.” To be sure, these outcomes are part of the reason that science has replaced religion and other conceptual frameworks. But how does science manage to generate these impressive results? What is it about science, and scientific conduct, that distinguish it from other systems of belief?

Over the past 100 years, philosophers have made considerable progress in answering this question. The aim of this course will be to review the philosophical theories and debates that have surrounded this field of research. The format of this course is organized around four very different types of answer to the question: “Why is science so successful?” Each answer corresponds roughly to a period in the recent (100 year) history of philosophy.

1. Science is successful because it is grounded in experience.

During the first half of the 20th Century, many philosophers became suspicious of intellectual traditions that pretended to be scientific but were really something else. Examples included the rise of Freudian psychoanalysis in psychology, the popularity of Hegelian Dialectic in philosophy, and the growth of Vitalism in developmental biology. To many philosophers these doctrines seemed obscure, highly bogus, and potentially socially damaging. It was therefore deemed important to identify the central requirements of any genuinely scientific belief system. Philosophers who identified with the Empiricist tradition pointed out that all of these apparently bogus doctrines share something in common: they appeal to the workings of unobservable or even mystical entities. Freudians posited “repressed memories” to explain why people suffer from certain ailments. Hegelians posited a “universal Spirit” to account for patterns in the history of science, philosophy, and art. Vitalists posited an “entelechy” or vital force to explain the coordination of cells in development. Hence, it was argued that the central requirement for any genuinely *scientific* claim is that it be grounded in experience.

The first objective of this course will be for students to understand the commitments of scientific Empiricism (also called Logical Empiricism), and the reasons that this approach was eventually

abandoned. Students will pursue this objective by attending lectures during the first two weeks of class, where we discuss the opening chapters of *Theory and Reality*. They will also write a short (2-3 page) critical paper on an influential essay by a leading Empiricist.

2. **Science is successful because it follows the right method.**

Students are often taught in their introductory science courses that there is a general “scientific method”. This idea traces back to the work of Karl Popper in the mid 20th Century, who was responding to the proposals of Logical Empiricists. Interestingly, most philosophers of science now reject Popper’s idea, despite the fact that it orthodoxy in many scientific circles.

A second objective of this course is for students to understand the motivation behind Popper’s proposal and the reasons that it fails. This will, in part, require that students understand the influence of Thomas Khun’s work and his historical approach to the philosophy of science. Students will work towards this objective by attending lecture during weeks 3 and 4, by critically engaging with the readings, and by writing a short paper applying Khun’s ideas to a case study.

3. **Science isn’t really so successful, we are just socially conditioned to revere it.**

Philosophical theories of science, following Khun, often focus on the social dynamics of science. This has generated some extreme forms of scientific skepticism, such as scientific constructivism –the view that all scientific knowledge is a social construct. More moderate theories adopt a feminist perspective, and identify certain biases inherent in scientific practice. In contemporary philosophy, many thinkers are drawn to the thesis of Scientific Pluralism- the view that science is composed of various research programs that each offer a different perspective on reality, but which do not comprise a single, unified body of knowledge.

A third objective of this course is for students to understand the social influences on science, and how scientific research is often directed by the social and economic interests of certain members of society. Students will gain a working understanding of social constructionism and pluralism by attending lecture during weeks 5 and 6. They will also write a short paper (3-4 pages) on a recent defense of pluralism: an excerpt from James Tabery’s (2014) *Beyond Versus*.

Students will come to understand feminist and sociological challenges to science by attending lecture during weeks 8 and 9, by critically engaging with the associated readings, and by writing a short paper (3-4 pages) on Donna Haraway’s feminist analysis of primatology.

4. **Science is successful when it embraces the right sorts of social practices.**

These debates over the past century have moved towards a practice-centered approach in the philosophy of science. Instead of viewing science as an abstract method, philosophers now focus on specific practices such as the peer review process and competition among researchers for notoriety. Contemporary philosophical questions surround the social mechanisms that contribute to knowledge acquisition, and the various factors that threaten to derail them.

The fourth objective of this course is for students to understand the practice-centered approach in the philosophy of science. They will come to understand this approach by attending lectures from weeks 10-12, and by critically analyzing the readings for this part of the course. They will also apply their knowledge to two contemporary issues: the involvement of scientists in the climate change debate, and the public understanding of vaccination. A final reflection essay (3-4 pages) will critically explore one of these two topics.

Readings and Course Website

The primary textbook for this course is Godfrey-Smith's *Theory and Reality*. All students are required to have a copy of this book. We will also be reading a section of articles and book chapters that will be available on the course webpage.

All course materials (assignments, readings, notes, etc.) are available on the course webpage: This is a website that the instructor personally maintains, separate from the Courselink page for this course. The site is accessible here. www.biophilosophy.ca/Teaching/Philosophy2180.html . You also easily find the site by going to my homepage: www.biophilosophy.ca. and looking under "Teaching" for the course number.

Assessment

Written assignments 40%

The bulk of students' grades will be earned by completing five written assignments, due approximately every two weeks (see below for exact due dates). Following each assignment there will be a class discussion on the relevant topic. It is therefore imperative that students submit the assignments on time—no late assignments will be graded without prior notification from the student. The aim of these assignments is not only to apply the concepts we are learning in class, but also for students to develop their skills in written communication and critical analysis.

Participation 10%

Each student will receive a participation grade at the end of the semester. This grade will reflect the student's contribution to class discussion, not only during the discussion sessions, but more generally throughout the semester. The aim of course participation is for students to develop their skills in the oral communication of complex ideas.

Midterm 20%

There will be a midterm exam mid-way through the semester. Students are responsible for all of the material that is covered in the readings and in lecture up to that point. A list of practice questions will be provided approximately one week prior to the exam.

Final Exam 30%

The final exam for this course is cumulative, however it will focus primarily on the material from the second half of the course. Again, students are responsible for all of the material covered in the readings and in lecture. Practice questions will again be provided about a week in advance.

Learning expectations

Students are expected to take responsibility for what they learn in this course. As the instructor, I present you with materials (online, in tutorial, and in lecture) that I hope will inspire, challenge and inform you. But ultimately you must take charge of your own intellectual growth and development.

Conduct

Many of the topics discussed in this class have deep personal significance for students. Some of those convictions will be challenged as we explore their rational justification. Some people sometimes find this process uncomfortable, viewing scrutiny of their ideas as a personal attack. We must all therefore make an effort to treat one another with respect. We must separate our assessment of ideas and arguments from our assessment of the individuals who might hold them.

Readings

Students are expected to show up to each class having read the material and completed the assignment for that day (if there is one).

Lectures

Lectures are designed to complement readings by providing background, emphasizing key concepts and arguments, and to provide a venue for students to ask questions. We should take these opportunities to explore questions together, even if they deviate sometimes from the lecture plan. Any question you have is fair game and I will do my best to answer it.

Class Notes

Students are expected to make their own notes in class that will help them to prepare for exams and for the assignments. This is seen as an important component in the development and synthesis of your ideas.

Writing Assignments

There will be five short (2-5 page) reflection essays. Their aim is to focus attention on certain aspects of the reading, to provide a venue for students to test ideas, and to help students develop philosophical skills. All written assignments will be submitted before the day and time that they are due using the Dropbox system in Courselink.

Late Assignment Policy

Written assignments are due before the designated time and due date. No assignments will be accepted late without prior approval from the instructor.

Plagiarism

Evidence of plagiarism will be taken extremely seriously, resulting in the submission of an academic misconduct report to the Assistant Dean of Arts. For additional information about student rights and responsibilities, as outlined by UofG College of Arts, please visit this website:

<http://www.academicintegrity.uoguelph.ca/plagiarism.cfm>

University Policies

The College of Arts has developed a list of policies surrounding students' rights and obligations. I am directing students to the website on which they are outlined (in order to save paper). But please do not assume that these are any less important than the other topics covered in this Syllabus. See here:

<http://biophilosophy.ca/Teaching/2180materials/COApolicies.pdf>

Week 1 – The empiricist approach to science.

Sept. 15 Read: Chapter 1, *Theory & Reality*, “Introduction” (p.1-12), and Sperber “The Guru Effect”.

Assignment 1: Critical analysis of Hempel’s “The Logical Analysis of Psychology”.
Due Sept 23.

Sept. 17 Read: Chapter 2, *Theory & Reality*, “Logic Plus Empiricism” (p. 19-37).

Week 2 – The problem of induction and other challenges to logical positivism.

Sept. 22 Read: Chapter 3, *Theory & Reality*, “Induction and Confirmation” (p. 39-56).

Sept. 23 **Assignment 1 submitted** via Courselink by 6 pm.

Sept. 24 Class Discussion of Hempel’s “The Logical Analysis of Psychology.”

Assignment 2: Critical Reflection-Goldfarb et al. “Are rival theories of smoking incommensurable?” due Oct 7.

Sept. 29 Read: Chapter 4, *Theory & Reality*, “Popper: Conjecture & Refutation” (57-74)

Oct. 01 Read: Chapter 5, *Theory & Reality*, “Kuhn and Normal Science” (p.75-86).

Week 4 – Paradigm shifts, Thomas Kuhn, and the challenge to objectivity.

Oct. 6 Read: Chapter 6, *Theory & Reality*, “Kuhn and Revolutions” (p. 87-101).

Oct 7 **Assignment 2 submitted** via Courselink by 6 pm.

Oct. 8 Class Discussion of Goldfarb “are rival theories of smoking incommensurable?”

Assignment 3: Critical analysis of Tabery, “Race, Genetics and the IQ controversy”. Due

Week 5 - Philosophy of science after Kuhn. `

Oct 13 No Class

Oct 15 Read, Chapter 7, *Theory & Reality*, “Lakatos & Feyerabend” (p. 102-121).

Week 6 – Case study in philosophical pluralism: The genetics of human intelligence.

Oct: 20 Read: Tabery, “The Origins of the Interaction Debate” (p. 13-43)

Oct 21 **Assignment 3 submitted** via Courselink by 6 pm.

Oct 22 Discuss: Tabery “Race, Genetics and IQ” (p. 43-73)

Week 7– Review and exam.

Oct. 27 Review of course themes.

Assignment 4: Critical analysis of Haraway, “Primatology is Politics.” Due Nov. 11.

Oct 29 Midterm Exam.

Week 8 –The Sociology of Science

Nov 3. Read: Chapter 8, *Theory & Reality*, “Challenge from Sociology” (p.122-135)

Nov. 5. Read: Okruhlik, “Gender and Biological Science”.

Week 9 – Feminist Philosophy and Science Studies

Nov. 10 Read: Chapter 9, *Theory & Reality*, “Feminism and Sci. Studies” (p.136-148)

Nov. 11 **Assignment 4 submitted** via CourseLink by 6 pm.

Nov. 12 Discuss: Primatology is Politics (Haraway)

Assignment 5: Critical analysis of climate change or vaccination paper.

Week 10 – Philosophical Naturalism and the Social Structure of Science

Nov. 17 Read: Chapter 10, *Theory & Reality*, “Naturalistic Philosophy” (p.149-163)

Nov 19 Read: Chapter 11, *Theory & Reality*, “Naturalism social structure” (p. 163-172)

Week 11 – Social Issues in Science

Nov.24 Read: K. Peacock, “Reticence, Responsibility, and Climate Science.”

Nov. 25 **Assignment 5 submitted** via CourseLink by 6 pm.

Nov. 26 Why don’t parents always vaccinate their kids? (Reading TBA)

Week 12 – Future of philosophy of science and course review.

Dec. 01 Overflow class.

Dec. 03 Review for final exam.

Final exam –Tuesday, December 8th, 8:30 am.