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PHILOSOPHY OF SCIENCE  
PHIL 310, FALL 2020

**Class meetings:** 9:30–10:20am on Wednesdays, Fridays, and select Mondays

**Office hours:** 10:30am–1:30pm on Mondays

**Zoom ID:** xxxxxxxxxxxxxxxxxxxxxx

**Course description:** The scientific revolution began with narrowly focused attempts to understand the movements of planetary objects and animal bodies. 400 years later, we know the age and constitution of the universe and the basis of heredity. We can predict short-term weather patterns and long-term climate change, make and break chemical bonds, and identify the neural basis of the human capacity to recognize faces. By all appearances, science seems to have made substantial progress and earned its reputation as humanity's most reliable means of understanding the world. This course is about how science has generated this understanding, and whether it has been as progressive, reliable, and unified as it seems. By way of examining case studies from across the natural and social sciences, we will study topics including the diverse sources of scientific knowledge, the purported objectivity of scientific theories, the ontological status of laws of nature, tensions between mechanical and teleological conceptions of nature, and the multifarious roles that values play in scientific research.

**No required books** (all required readings available as PDFs on eCampus)

**Brief schedule**

**Sources of scientific explanation**

Week 1: Why not all evidence is scientific evidence

Week 2: Observations, experiments, and models

Week 3: Philosophical writing workshop I

Week 4: Science and pseudoscience

*media project due 9/9*

*argument consultations 9/14*

**Objectivity, realism, and values in science**

Week 5: Laws of physics

*argument consultations 9/21*

Week 6: Paradoxes of confirmation

*argument consultations 9/28*

Week 7: Revolution!

*argument consultations 10/5*

Week 8: Social construction and realism

*argument consultations 10/12*

Week 9: Values in science

*argument consultations 10/19*

**Case study: craniometry and psychometrics**

Week 10: Skull capacity and bias

*outline consultations 10/26*

Week 11: IQ and measurement

*outline consultations 11/2*

Week 12: IQ and the social context of science

*outline consultations 11/9*

**Wrap-up**

Week 13: Why trust science?

*outline consultations 11/16, 20, 23*

Week 14: Philosophical writing workshop II

*revised outline consultations 12/2, 4*

*thesis paper due 12/11*

**Brief grading breakdown**

Participation: 20%  
Media project: 20%  
Two argument sketches: 10%  
Two paper outlines: 10%  
Revised paper outline: 10%  
Thesis paper: 30%

**Grade scale**

A: 90–100%  
B: 80–89%  
C: 70–79%  
D: 60–69%  
F: 0–59%

**Assignments**

Other than participation and the media project (both described below), all of your assignments for this class will directly prepare you for writing a 1,000–2,000 word final paper defending an original thesis in the philosophy of science. Detailed expectations for these assignments—which will include two argument sketches, two paper outlines, and a revised paper outline, as well as the thesis paper itself—will be discussed during our in-class writing workshop on 9/9 and 9/11.

**Participation**

This course will be run as a seminar, and thus will require each student's effective participation. Effective participation involves engaging in live class discussions in a manner that demonstrates you have done the assigned reading, as well as thoughtfully and respectfully commenting on classmates' argument sketches and outlines on our eCampus discussion board. You will receive up to 1 point per week in which you engage in live class discussions, and up to 1 point per week in which you comment on classmates' argument sketches and outlines.

**Media project**

Analyze how scientific research is discussed in a popular media venue. Locate a story in a major media source that cites at least one scientific study, and then read the original scientific journal article that presents that study. Then write a four-paragraph essay evaluating the portrayal of science (and its philosophy) in the media.

- 1) First paragraph: explain one relevant finding in your own words.
- 2) Second paragraph: identify the scientific method(s) used to reach that finding.
- 3) Third paragraph: assess the accuracy of the media portrayal of the science.
- 4) Fourth paragraph: if the media source explicitly raises a philosophical issue, assess how well it discusses that issue. Or, if not, raise a philosophical issue yourself and explain why it would have been worth discussing.

Each paragraph is worth 5 points. Paragraphs 1 and 2 will be graded for accuracy and cogency; paragraphs 3 and 4 will be graded for thoughtfulness and insightfulness.

**Late policy**

Late assignments will not be accepted unless an extension has been granted. If you need to request an extension of the deadline for any assignment, please email me at least 48 hours prior to the original due date.

**Detailed schedule****Sources of scientific explanation**

8/26: Scientific evidence

**Reading:** Santana, "Why not all evidence is scientific evidence" (1–12)

8/28: The scientific revolution and (the?) scientific method(s)

**Reading:** Potochnik, Colombo, & Wright, *Recipes for Science* (Ch. 1)

8/31: Brief individual introductory meetings with Dr. Curry

9/2: Observations and experiments

**Reading:** Hacking, *Representing and Intervening*, (Chs. 9 & 10)

Diamond, "Ecology: Laboratory, Field, and Natural Experiments"

9/4: Models, including computer simulations

**Reading:** Jacquart, "Observations, Simulations, and Reasoning in Astrophysics"

9/7: No class, Labor Day

9/9: Writing workshop

9/9: media project due

9/11: Writing workshop

9/14: First argument sketch consultations

9/16: Umbrellaology

**Reading:** Somerville, "Umbrellaology, or, Methodology in Social Science"

9/18: Science and pseudoscience

**Reading:** Popper, "Science: Conjectures and Refutations"

Lakatos, "Science and Pseudoscience"

**Objectivity, realism, and values in science**

9/21: First argument sketch consultations

9/23: Laws of nature

**Reading:** Feynman, *The Character of Physical Law* (Ch. 1)

9/25: Is the law of gravitation a lie?

**Reading:** Cartwright, "Do the Laws of Physics State the Facts?"

9/28: First argument sketch consultations

9/30: Induction and confirmation

**Reading:** Hempel, *Philosophy of Natural Science* (Chs. 2–4)

10/2: Paradoxes of induction and confirmation

**Reading:** Goodman, *Fact, Fiction, and Forecast* (72–80)

*Ways of Worldmaking* (138–140)

10/5: Second argument sketch consultations

**10/7: Scientific paradigms****Reading:** Kuhn, *The Structure of Scientific Revolutions* (Ch. 9)**10/9: Revolution!****Reading:** Kuhn, *The Structure of Scientific Revolutions* (Ch. 10)**10/12: Second argument sketch consultations****10/14: Scientific realism and social construction****Reading:** Hacking, *The Social Construction of What?* (Ch 1.: 1–3, 21–24, 29–34, Ch. 3)**10/16: Weapons research****Reading:** Hacking, *The Social Construction of What?* (Ch. 6)**10/19: Second argument sketch consultations****10/21: Scientific and extra-scientific norms****Reading:** Longino, “Values and Objectivity”**10/23: Climate change****Reading:** Jebeile, “Values and Objectivity in the IPCC”**Case study: Craniometry and psychometrics****10/26: First outline consultations****10/28: Skull capacity and intelligence****Reading:** Gould, *The Mismeasure of Man* (82–104)**10/30: Mismeasurement and bias****Reading:** Lewis et al., “The Mismeasure of Science”  
Weisberg, “Remeasuring Man”**11/2: First outline consultations****11/4: Do IQ tests measure intelligence?****Reading:** Block & Dworkin, “IQ: Heritability and Inequality, Part I” I–VI (331–378)**11/6: If IQ tests don’t measure intelligence, what do they measure?****Reading:** Block & Dworkin, “IQ: Heritability and Inequality, Part I” VII–VIII (378–407)**11/9: First outline consultations****11/11: Heritability and inequality****Reading:** Block & Dworkin, “IQ: Heritability and Inequality, Part II” I–II (40–80)**11/13: Race, research, and responsibility****Reading:** Block & Dworkin: “IQ: Heritability and Inequality, Part II” III (80–99)**Wrap-up****11/16: Second outline consultations****11/18: Wrap-up****Reading:** Cartwright, “Why Trust Science?”

11/20: Second outline consultations

11/23: Second outline consultations

11/25–27: *No class, Thanksgiving*

11/30: Writing workshop

12/2: Revised outline consultations

12/4: Revised outline consultations

12/11: **final paper due**

### **Other expectations and policies**

#### **Expected learning outcomes**

Upon successful completion of this course, students will be better able to:

- 1) Understand the diverse sources of scientific understanding, and fundamental contours of philosophical debates about objectivity and values in science.
- 2) explain how philosophy and science relate;
- 3) develop and defend original philosophical theses;
- 4) write expository and argumentative prose clearly and concisely.

#### **Some tips**

Set aside at least six hours a week, outside of class, to engage in the sustained, attentive, and reflective thinking which philosophical reading demands. Come to each class having read—and reread as many times as are necessary for comprehension—the assigned text(s). Ask questions. Contribute to class discussion when you have something to say. Listen to your peers carefully and respectfully whether or not you have something to say. Come chat with me in office hours whenever you want to review (or delve deeper into) something we have read or discussed in class.

#### **Plagiarism**

Don't do it. Exercise academic integrity, as defined by the WVU Policy on Student Academic Integrity. Plagiarism (or abetting another student plagiarizing) will result in an automatic zero on the plagiarized assignment, as well as a formal complaint. If you have questions about what constitutes plagiarism, please ask.

#### **Accommodations**

If you have good reason to be exempt from (or subject to a modified version of) any policy on this syllabus, please let me know. We'll work something out. If you have a disability and anticipate needing any type of accommodation in order to participate in this course, please let me know and make appropriate arrangements with the Office of Accessibility Services (<https://accessibilityservices.wvu.edu/>).

#### **Statement of non-discrimination**

The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. Our discussions will be predicated on these commitments.