

## PHIL 2160: Philosophy of Science Survey

Spring 2020, Tuesdays and Thursdays, 12–1:20pm, Ellis Hall 014

### Instructor

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### Course Description

What is science? How does scientific research work? How does science produce, organize, and revise our knowledge about the world? What is the relationship between science and the rest of society? These are some of the philosophical issues about science we'll discuss in this course.

### Learning Outcomes

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

1. Describe the philosophical questions discussed in the readings.
2. Describe different positions one might take in response to these questions.
3. Summarize arguments for and against these positions.
4. Analyze and evaluate arguments for and against various positions discussed in the course.

### Prerequisites

None

### Textbook

You must have a personal copy of Bortolotti's textbook:

Lisa Bortolotti, *An Introduction to the Philosophy of Science*. Polity Press, 2008. ISBN: 978-0745635392.

This book is also on reserve at the library. Other readings will be posted on Blackboard.

### Top Hat

We will be using the Top Hat ([www.tophat.com](http://www.tophat.com)) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or through text message. You can visit the Top Hat Overview (<https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide>) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system. *You must register for a Top Hat account, or your responses will not be graded.* Since Top Hat requires specific user information to troubleshoot issues, if you require assistance with Top Hat, please contact their support team directly by email ([support@tophat.com](mailto:support@tophat.com)), by the in-app support button, or by calling 1-888-663-5491.

## Assignments and Final Grades

Below are the assignments required in this course and their weights toward the final grade.

| Assignments | Weight (%) |
|-------------|------------|
| Quizzes     | 15         |
| Exam 1      | 10         |
| Exam 2      | 15         |
| Exam 3      | 15         |
| Final Exam  | 25         |
| Box Project | 20         |
| Total       | 100        |

You will receive a final letter grade according to the following grading scale. Your percentage points will be rounded to the nearest one (e.g., 92.5 is rounded up to 93; 89.4 is rounded down to 89). Although not formalized in the table above, your improvements over the course of the semester and exceptionally good participation in lecture and discussion will count favorably toward your final grade.

| Grade | Percentage  | Grade | Percentage  |
|-------|-------------|-------|-------------|
| A     | 93 or above | C     | 73–76       |
| A–    | 90–92       | C–    | 70–72       |
| B+    | 87–89       | D+    | 67–69       |
| B     | 83–86       | D     | 63–66       |
| B–    | 80–82       | D–    | 60–62       |
| C+    | 77–79       | F     | 59 or below |

*You can expect to get an A only if you meet the course requirements and expectations in an exemplary manner and you demonstrate that you have attained the learning outcomes at a sophisticated level.*

## Course Policies

All students in this course are expected to comply with the following policies.

**Academic Integrity:** Academic integrity and honesty are basic values of Ohio University. Students are expected to follow standards of academic integrity and honesty. Academic misconduct is a violation of the Ohio University Student Code of Conduct subject to a maximum sanction of disciplinary suspension or expulsion as well as a grade penalty in the course. You are expected to be familiar with the information on academic integrity provided at <http://www.ohio.edu/communitystandards/academic/students.cfm>.

**Turnitin:** Students agree that by taking this course all required assignments may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of Turnitin.com page service is subject to the Usage Policy and Privacy Pledge posted on the Turnitin.com site.

**Classroom Incivility:** You are expected to behave in a civil manner, carefully listen to whoever is talking at a moment, and respect other people in class. I will not tolerate behaviors that are harmful to the learning of students, such as distracting your classmates' attention (e.g., by chatting with someone next to you), disrupting other people's speech, mocking or insulting other people, and showing general disrespect and poor manners toward other people in class. If you harm your classmates' learning in these ways, you will be asked to leave the classroom.

**Electronic Devices:** During class, you may use laptops or tablets only to take notes or to view assigned readings, but you may not use any electronic devices, such as cellphones, tablets, and laptops, while you are taking exams in class.

**Grade Disputes:** If you believe that a grade on any specific assignment was in error, or unfair, you should resubmit that assignment, along with a brief cover note detailing those prima facie errors, or disagreement, together with appropriate evidence. The same procedure should be followed regarding the final grade. A request for re-grading or re-assessment is just that: the revised grade may increase, remain unchanged, or decrease. An explanation will be provided to the student in any case. Note that this policy does not apply to grade *calculation* errors, which should be brought to my attention right away.

**No Extra Credit:** There will be no extra credit assignments in this course.

**Attendance:** Attendance will not be taken but is necessary to take in-class quizzes and participate in group activities.

**Late or missed assignments:** Three (3) lowest quiz scores will be dropped, and there will be no makeup quizzes. A makeup exam can be arranged only in exceptional circumstances described below. See the box project handout for the policies on late assignments related to the project.

**Absences:** The policy on late or missed assignments give you some freebies. You are to use these freebies to cover occasional sick days and other absences. If you must miss a large portion of the semester due to illness or other reasons, you should talk to your advisor and instructors as soon as possible.

**Exceptional circumstances:** In general, an exceptional circumstance is a medical emergency, the death of a near relative, or a university-related trip (e.g., athletic team commitments). If you are in these circumstances, (i) obtain written documentation from a relevant authority (e.g., doctor, coach, etc.) verifying that you are/were in one of these circumstances, (ii) contact me as soon as you can to set up an appointment, and (iii) show me the documentation. I will then decide how to apply the policy on late or missed assignments and exams to your circumstance, and I will make, by mutual agreement, any necessary makeup assignments or other arrangements.

**24-Hour Email Policy:** I will respond to your email within 24 hours of receipt, unless I'm stranded in the middle of nowhere. If you don't get a response after 24 hours, please resend an email.

## University Resources for Learning

Your success in this course is important to me. I recognize that there are multiple ways to learn and that this multiplicity should be acknowledged in the structure of university courses and the evaluation of their participants. Thus, I encourage you to discuss your learning styles and comprehension requirements with me during my office hours or at another arranged time, if necessary. It is best to do this as early as possible. Every student is entitled to a meaningful and stimulating learning experience, and you are strongly encouraged to use the services provided by the Academic Achievement Center (<https://www.ohio.edu/uc/aac>) and the Student Writing Center (<https://www.ohio.edu/uc/aac/swc>). Disabled students are also strongly encouraged to use the services provided by Student Accessibility Services (<https://www.ohio.edu/uc/sas>), including the provision of note-takers, transcribers, and sign-language interpreters.

## Disclaimer

Although the learning outcomes are reasonable for a lower-division undergraduate course and can be achieved by most students, students may still vary in their competency and performance levels on these outcomes. They can expect to achieve these outcomes only if they honor all course policies, attend and participate in classes regularly, and complete all assigned work in good faith and on time.

This syllabus is subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better student learning. All materials associated with this class that are developed by the instructor are copyrighted in the name of Yoichi Ishida on this date January 14, 2020.

## Schedule

The following is a tentative schedule of topics, reading, and assignments. You are expected to have done the assigned reading *before* each class.

| Wk | Date        | Topics                       | Readings   |
|----|-------------|------------------------------|--|
| 1  | Tue, Jan 14 | Introduction                 | Syllabus   |
|    | Thu, Jan 16 | Demarcation Problems         | <b>Bortolotti</b> , <i>An Introduction to the Philosophy of Science</i> , pp. 1–6.<br><b>French</b> , <i>Philosophy of Science: Key Concepts</i> , pp. 11–22 (on discovery). |
| 2  | Tue, Jan 21 | Science and Non-Science      | <b>Bortolotti</b> , pp. 6–13.<br><b>Popper</b> , “Science: Conjectures and Refutations” (excerpts).  |
|    | Thu, Jan 23 | Science and Pseudoscience    | <b>Bortolotti</b> , pp. 13–18.<br><b>Thagard</b> , “Why Astrology is a Pseudoscience.”   |
| 3  | Tue, Jan 28 | What is Scientific Research? | <b>Bortolotti</b> , pp. 22–25.<br><b>Haack</b> , “Trial and Error: The Supreme Court’s Philosophy of Science.”   |
|    | Thu, Jan 30 | Good and Bad Science         | <b>Bortolotti</b> , pp. 25–29.<br><b>Oreskes and Conway</b> , <i>Merchants of Doubt</i> (Intro, Ch.1).   |

|                               |             |  |  |
|-------------------------------|-------------|--|--|
| 4                             | Tue, Feb 4  | <b>Exam 1</b>  |  |
|                               | Thu, Feb 6  | Scientific Reasoning   | <b>Bortolotti</b> , pp. 30–37.   |
| 5                             | Tue, Feb 11 | Induction  | <b>Bortolotti</b> , pp. 38–45.   |
|                               | Thu, Feb 13 | Problem of Induction   | <b>Bortolotti</b> , pp. 45–52.   |
| 6                             | Tue, Feb 18 | Heuristics; <b>Box Project Report 1 Due</b>                        | <b>French</b> , pp. 29–38 (on heuristics).   |
|                               | Thu, Feb 20 | Heuristics   | <b>French</b> , pp. 39–49 (on heuristics).   |
| 7                             | Tue, Feb 25 | <b>Exam 2</b>  |  |
|                               | Thu, Feb 27 | Scientific Theories  | <b>Bortolotti</b> , pp. 53–60.<br><b>French</b> , pp. 97–106 (on observation).                                     |
| 8                             | Tue, Mar 3  | Scientific Explanation   | <b>Bortolotti</b> , pp. 71–80.<br><b>Van Fraassen</b> , <i>The Scientific Image</i> (selections).                  |
|                               | Thu, Mar 5  | Scientific Models  | <b>Cartwright</b> , <i>How the Laws of Physics Lie</i> (selections).   |
| <b>Spring Break: Mar 8–14</b> |             |  |  |
| 9                             | Tue, Mar 17 | Scientific Realism   | <b>Bortolotti</b> , pp. 96–111.  |
|                               | Thu, Mar 19 | Scientific Revolutions   | <b>Bortolotti</b> , pp. 112–125.<br><b>Kuhn</b> , <i>The Structure of Scientific Revolutions</i> (selections).     |
| 10                            | Tue, Mar 24 | Scientific Progress; <b>Box Project Report 2 Due</b>               | <b>Bortolotti</b> , pp. 125–133.<br><b>Kuhn</b> (selections).  |
|                               | Thu, Mar 26 | Values and Scientific Objectivity                                  | <b>French</b> , pp. 183–197 (on gender bias).<br><b>Longino</b> , <i>Science as Social Knowledge</i> (selections). |
| 11                            | Tue, Mar 31 | <b>Exam 3</b>  |  |
|                               | Thu, Apr 2  | Pre-presentation Workshop  |  |
| 12                            | Tue, Apr 7  | <b>Presentations</b>   |  |
|                               | Thu, Apr 9  | <b>Presentations</b>   |  |
| 13                            | Tue, Apr 14 | Box Project Prize; Ethics of Science                               | <b>Bortolotti</b> , pp. 134–146.   |
|                               | Thu, Apr 16 | Ethics of Science  | <b>Bortolotti</b> , pp. 147–163.   |
| 14                            | Tue, Apr 21 | Science and the Public   | <b>Oreskes and Conway</b> , <i>Merchants of Doubt</i> (Ch.5–6).  |
|                               | Thu, Apr 23 | Science and the Public; <b>Box Project Personal Reflection Due</b> | <b>Oreskes and Conway</b> , <i>Merchants of Doubt</i> (Ch.5–6).  |

**Final Exam: Thursday, April 30, 10:10–12:10pm.**