

## **PHIL 380 The Nature of Science**

Fall 2018

T Th 10:20-11:40

351 Natural Sciences Building

Prof. Heather Douglas

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Department of Philosophy

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Office Hours: Thursday 1-3 pm, and by appt.

What is the nature of science? This course will begin by examining the structures of inference used in science and the role evidence and theory play in that inference. But science as an activity is not just about evidence and theory. Science is pursued by an epistemic community of scientists. We will spend the second section of the course examining the nature of this community and why it is so important to the pursuit of scientific knowledge. Finally, in the third section, we will examine the role of values in science (both epistemic and non-epistemic) and their importance for scientific practice.

The goals of the course are to:

- 1) Provide an introduction to several central themes in how to understand science
- 2) Encourage students to connect the philosophical ideas to their own experiences with science
- 3) Develop an understanding of the nature of science as both a source of knowledge and as a human practice
- 4) Practice writing with precision about the nature of science

Required Texts: *The Meaning of Science* (by Tim Lewens)

Additional readings posted on D2L

### Part I: Evidence and Inference in Science

Aug. 30: Introduction to Inference in Science

Sep. 4: Popper (Lewens chap. 1)

Sep. 6: Demarcating Science (Lewens chap. 2, Laudan 1983)

Sep. 11: Observation and Theory (Hempel 1966)

Sep. 13: Experiment and Theory (Two excerpts from Duhem 1906)

Sep. 18: Theory-Laden Observation (Hanson 1958)

Sep. 20: Scientific Change (Lewens chap. 3)

Sep. 25: Science and Progress (Douglas 2014)

Sep. 27: Realism I (Lewens chap. 4)

Oct. 2: Realism II (Hacking 1983)

Oct. 4: Exam 1

## Part II: Social Epistemology of Science

Oct. 9: Social Norms of Science (Merton 1942)

Oct. 11: Trust within Science (Hardwig 1991)

Oct. 16: Social Objectivity (Longino 1990 chap. 4)

Oct. 18: Diversity in Science (Solomon 2006)

Oct. 23: Diversity in Science II (Intemann 2009)

Oct. 25: Citizen Science (Frickel et al 2010)

Oct. 30: Justice and Science (Tarbell & Arquette 2000)

Nov. 1: Film: *Merchants of Doubt*

Nov. 6: Review Day (and Election Day)

Nov. 8 Exam 2

## Part III: Values and Science

Nov. 13: Values and Theory Choice (Kuhn 1977)

Nov. 15: Epistemic Values (Longino 1996, Douglas 2013)

Nov. 20: Inductive Risk (Douglas 2000)

Nov. 22: Thanksgiving!

Nov. 27: Values in Feminist Science (Anderson 2004)

Nov. 29: Epistemic Priority (Brown 2013)

Dec. 4: The Goals for Science (Elliott and Mckaughan 2014)

Dec. 6: Democracy and the Value-Free Ideal (Bright 2017)

Dec 13, 10-11:50: Exam 3

### Course requirements

Reading responses (5% each for 15% total):

Each student will be assigned one reading in each part of the course for which the student must prepare a brief statement (100-200 words) about what is interesting in the reading to them, noting the implications of a reading for a particular example (perhaps from their own experience), and/or raising a question about the reading. This response is to be posted on D2L by 9 am the day the reading is to be discussed in class. During the class, the students who are so prepared will be asked to share their insights and questions about the reading, to help structure the discussion of the day. If you would prefer, I can draw from your response directly—just let me know. Late work will be accepted up until class meets but will be penalized. After the class meets, late work will not be accepted without a documented reason.

Three exams (20% each for 60% total):

At the end of each of the three parts of the course, there will be an exam that will require paragraph (or shorter) length responses to questions about the material covered in that section of the course. This is an opportunity to express a precise grasp of the key ideas and arguments we have discussed in each section. Exams will thus be graded for accuracy, clarity, and completeness of answers. Exams will not be cumulative.

Final paper (5% + 20% for 25% total):

At the end of the course, students will submit a 1500-2000 word essay about a philosophical topic of the student's choosing related to the material covered in the course. This will be an opportunity to reflect on and develop ideas about any of the topics discussed in the course. Please submit a paper proposal of 100-200 words to me via D2L by Nov. 15 (worth 5%). Earlier submissions or discussions about a paper topic are welcome. The final paper is due via D2L (using Turnitin) on December 10, and is worth 20%. Late assignments are accepted, but with a 5% grade penalty for every 24 hours.

Consistent with MSU's efforts to enhance student learning, foster honesty, and maintain integrity in our academic processes, I will use Turnitin to compare a student's work with multiple sources, drawing on an extensive database of prior publications and papers, providing links to possible matches and a "similarity score" (which is often by itself not indicative of anything). The tool does not determine whether plagiarism has occurred or not. Instead, I will judge the originality of

your work. Students should submit final papers to Turnitin Dropboxes without identifying information included in the paper (e.g., name or student number). The system will automatically show this information to me when I view your submission, but that information will not be retained by Turnitin. The text of your paper will be retained in the global repository hosted by Turnitin to provide ongoing protection of your work.

### Course policies and recommendations

Come to class prepared to discuss the readings, even if you are not tasked with reading preparation that day. If you are not comfortable sharing thoughts directly with the class, you may use D2L's discussion board to post comments and thoughts, or email them directly to me. Engaging with the course by completing readings prior to meetings and coming prepared to actively work through the arguments in the readings is central to doing well in the course.

As the MSU statement on diversity and inclusion notes, "MSU welcomes a full spectrum of experiences, viewpoints, and intellectual approaches because they enrich the conversation, even as they challenge us to think differently and grow. However, we believe that expressions and actions that demean individuals or groups compromise the environment for intellectual growth and undermine the social fabric on which the community is based." This class will be a mixture of lecture and discussion, and as such, the classroom should be a space where ideas and their implications can be collectively and critically explored. Please come to class prepared for engaging constructively in this kind of discussion.

Regular attendance is important to doing well in the course. However, please do not come to class if you are ill. In particular, if you are running a fever higher than 100 F (without medication) or you are vomiting, you are probably contagious and you should stay home. Be sure to notify me via email and to get notes from fellow classmates to find out what you missed. If you miss an exam, you must provide appropriate documentation if you wish to make up the exam.

Your final grade will be first determined on a 100-pt. scale based on the weightings given above, and then converted to a 4.0 scale according to the tabulations below. For example, a final grade of an 83% corresponds to a 3.0 and a 77% corresponds to a 2.5.

4.0=90% and above

3.5=85–89%

3.0=80–84%

2.5=75–79%

2.0=70–74%

1.5=65–69%

1.0=60–64%

Communication outside of class will primarily be through MSU email and D2L. Be sure to actively monitor your MSU email for any course updates. I am also most easily reachable by email and will generally respond within 24 hours.

It is strongly recommended that you not use electronic devices in the classroom. Student learning is generally hampered rather than helped by such devices, as for most, taking notes by hand improves comprehension and recall. Some, however, find electronic devices a crucial aid. If electronic devices are used, please sit so that your screens are less of a distraction to others. If you are found using such devices for non-course purposes while in class or if your device makes disruptive noise, I will confiscate your device for the duration of the class. Repeated violations will lead to a ban on devices for that individual.

**Academic Integrity:** Academic integrity is central to any learning environment. As the Spartan Pledge<sup>1</sup> makes clear, violations of academic integrity damage both your learning and the learning community in which you are participating. Any cheating, whether on an exam or plagiarism on a paper, will result in an automatic failure (a grade of 0) of that assignment. More about academic integrity can be found here: <https://ombud.msu.edu/academic-integrity/What%20is%20Academic%20Integrity.html>

**Accommodations for Students with Disabilities** (from the Resource Center for Persons with Disabilities (RCPD): Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at [rcpd.msu.edu](http://rcpd.msu.edu). Once your eligibility for an accommodation has been determined, you will be issued a verified individual services accommodation (“VISA”) form. Please present this form to me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc.). Requests received after this date will be honored whenever possible.

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<sup>1</sup> “As a Spartan, I will strive to uphold values of the highest ethical standard. I will practice honesty in my work, foster honesty in my peers, and take pride in knowing that honor in ownership is worth more than grades. I will carry these values beyond my time as a student at Michigan State University, continuing the endeavor to build personal integrity in all that I do.”