

PHIL132 Epistemology: On Scientific Knowledge

Eugene Y. S. Chua

Summer Session II, 2022

Course Description

The word “epistemology” stems from the Greek words “episteme” and “logos”, translated roughly as “knowledge”, and “reason” or “argument”, respectively. In short, epistemology is the branch of philosophy which focuses on the study of the various aspects of *knowledge*, asking questions like “what can we know?”, “how do we know?”, “what are the conditions for knowledge?”, and “what are we justified in knowing?”, among other questions.

In this course, we will focus on the study of *scientific* knowledge. Interestingly, the word “science” stems from the Latin “scientia”, which *also* translates roughly to “knowledge”. After all, a paradigm of contemporary human knowledge is scientific knowledge.¹ We frequently appeal to and rely on scientific knowledge: our GPS works because of general relativity, our semiconductors are designed with quantum-mechanical principles in mind, and we take vaccines because we think the science behind it is trustworthy, etc. But **what is scientific knowledge? How do we acquire scientific knowledge?** These two questions will be the driving questions of our course for the next five weeks, and I hope you will walk away from this course with at least some tentative answers to these big questions.

Required Materials

- All assigned reading materials will be freely available on Canvas as PDFs.

Course Objectives

Students should:

1. understand what the **demarcation problem** is.

¹Note! This is not to discount other forms of human knowledge, such as mathematical knowledge, moral knowledge, and other forms of knowledge. But we can’t study everything in a short 5 weeks course, alas.

2. be able to **effectively argue for a stance on the demarcation problem**, based on the required readings.
3. understand what **the problems of induction** and **paradoxes of confirmation** are.
4. understand what **idealizations** are, what **'de-idealizations'** are, and **qualitatively** provide an example of **de-idealization**.
5. understand what **the ideal of value-free science** is.
6. be able to **effectively argue for their own stance**, based on the required readings, on:
 - how the Bayesian proposal might solve at least one of the problems of induction or paradoxes of confirmation.
 - whether idealizations need 'de-idealization', and why.
 - whether the ideal of value-free science should be accepted or rejected.

Course Structure

Class Structure

This course is **entirely remote**, and will not have any sections.

Instead, I will be mixing elements of **discussion sections** and **lectures** into each class. I will naturally go through the content of the required reading for the day. However, I will also incorporate activities for group discussion, as well as more open-ended discussion on the required reading for the day. You are **encouraged to bring questions to class!** Everything will be recorded and uploaded to Canvas for asynchronous access.

Every class will be approximately 2 hours to 2.5 hours long, with a short break in the middle. I don't believe it's conducive to have Zoom meetings for much longer than that. However, I will hang around for the remainder of the allocated period if you'd like to chat – **priority will be given to those who can't make it for office hours!**

Assignments

There will be six assignments for this course: two major **essays**, and four minor **discussion board assignments**.

Minor: Discussion Board Assignments (5% each)

- **Discussion Board Assignment 1 – an initial grip on the Demarcation Problem** (due Sunday 2359hrs, 08/07)
- **Discussion Board Assignment 2 – Craft a first attempt for essay 1** (due Sunday 2359hrs, 08/14)

- **Discussion Board Assignment 2 – Review someone else’s first attempt for essay 1** (due Wednesday 2359hrs, 08/17)
- **Discussion Board Assignment 3 – Confirmation / idealizations** (due Sunday 2359hrs, 08/28)

Major: Essays (30% each)

- **Essay 1 – The Demarcation Problem** (1200 – ~1400 words)
 - What is the demarcation problem? Is it a pseudo-problem in your view? Why?
- **Essay 2 – Choose one:** (1200 – ~1400 words)
 1. Choose one from the following: (i) the ravens paradox, (ii) the problem of induction, or (iii) the grue paradox. Explain clearly what the problem is, and why it is problematic for HD. What is a common response to the problem, and why does that not work? Then, clearly explain how the Bayesian confirmation theorist can respond to the problem.
 2. What are idealizations, and why might their use in science be a problem? Do they need to be ‘checked’? If so, how? If not, why not?
 3. What is the value-free ideal in science? Is it defensible in your view? Why or why not?
 4. Come up with your own question. However, any such question should **first be approved by me or Nate**.

Resources

Here are some resources you can and should appeal to, throughout the course:

- Us! Your TA (Nate) and I are here to help you to the best of our abilities. Come for our office hours!
- The required readings should contain the content you’ll need to answer the essay questions. The supplemental readings offer more depth to the discussion.
- The Stanford Encyclopedia of Philosophy is an excellent, rigorous, online, and (!) free resource for almost every philosophical topic you can think of. For any philosophical topic X, search for “X sep” on your favorite search engine and you should find an appropriate entry.

Schedule and readings

The readings are separated into *required* and *supplemental* readings. You will *only ever be expected to read the required readings*, and you *should* read the required readings first before venturing into the supplemental readings. However, the supplemental readings are good sources for deepening an understanding of the topic in question. All required readings will be available on Canvas or are freely accessible online. Note that readings may be subject to change. You will be notified in advance of any such changes.

Week 1, 08/01 - 08/05: What is *scientific* knowledge? Demarcating science from pseudoscience.

- *Assignments:*
 - **Discussion board assignment 1: Getting a grip on the Demarcation Problem** – due Sunday 2359hrs, 08/07.
- *Required readings:*
 - **Monday 08/01:** Peter Godfrey-Smith, *Theory and reality: an introduction to the philosophy of science*, Ch. 1: Introduction.
 - **Wednesday 08/03:** Larry Laudan, "The Demise of the Demarcation Problem".
- *Supplemental Readings:*
 - Sven Ove Hansson, "Science and Pseudo-Science". *The Stanford Encyclopedia of Philosophy*
URL = <<https://plato.stanford.edu/archives/fall2021/entries/pseudo-science/>>.
 - Maarten Boudry, "Diagnosing Pseudoscience – by Getting Rid of the Demarcation Problem".

Week 2, 08/08 - 08/12: Demarcating science from pseudoscience (Cont'd) / What does it mean to *confirm* a scientific theory with evidence?

- *Assignments:*
 - **Discussion board assignment 2: Craft and Review Paragraphs to Essay 1**
Craft: due Sunday 2359hrs, 08/14 | **Review:** due Wednesday 2359hrs, 08/17
- *Required readings:*
 - **Monday 08/08:** Massimo Pigliucci, "The Demarcation Problem (A Belated Reply to Laudan)" | Philip Kitcher, "Believing Where We Cannot Prove".
 - **Wednesday 08/10:** Peter Godfrey-Smith, *Theory and reality: an introduction to the philosophy of science*, Ch. 3: Induction and Confirmation.

- *Supplemental Readings:*
 - Paul Horwich, "Wittgensteinian Bayesianism".
-

Week 3, 08/15 - 08/19: Confirmation (cont'd) / Justifying the use of idealizations in science

- *Assignments:*
 - **Essay 1: The Demarcation Problem (1200 – ~1400 words)** – due Sunday 2359 hrs, 08/21.
 - *Required readings:*
 - **Monday 08/15:** Michael Strevens, "Notes on Bayesian Confirmation Theory", Chs. 7 and 8.
 - **Wednesday 08/17:** Ernan McMullin, "Gallilean Idealization".
 - *Supplemental Readings:*
 - Michael Strevens, "Notes on Bayesian Confirmation Theory".
 - Vincenzo Crupi, "Confirmation", *The Stanford Encyclopedia of Philosophy* <<https://plato.stanford.edu/archives/spr2021/entries/confirmation/>>.
 - Michael Weisberg, "Three Kinds of Idealizations".
-

Week 4, 08/22 - 08/26: Idealizations in science (cont'd) / Why trust science?

- *Assignments:*
 - **Discussion board assignment 3: Confirmation / Idealizations & Approximations** – due Sunday 2359hrs, 08/28.
 - *Required readings:*
 - **Monday 08/22:** Angela Potochnik, *Idealization and the Aims of Science*, Ch. 2. (Skim 2.1, focus on 2.2!)
 - **Wednesday 08/24:** Naomi Oreskes, *Why Trust Science?*, Ch. 1.
 - *Supplemental Readings:*
 - Tarja Knuuttila & Mary S. Morgan, "Deidealization: No Easy Reversal".
 - Naomi Oreskes, *Why Trust Science?*, Ch. 2.
-

Week 5, 08/29 - 09/02: Values in science, and the value-free ideal.

- *Assignment:*
 - **Essay 2: Facets of Scientific Knowledge (1200 – ~1400 words)** – due Sunday 2359 hrs, 09/04
 - *Required readings:*
 - **Monday 08/29:** Heather Douglas, "Rejecting the Ideal of Value-Free Science".
 - **Wednesday 08/31:** Gregor Betz, "In Defence of the Value Free Ideal".
 - *Supplemental Readings:*
 - Liam Kofi Bright, "DuBois' democratic defence of the value free ideal".
 - Marc Lange, "What would reasons for trusting science be?"
-

Grading Policy

- 20% of your grade will be determined by **participation and attendance** in class. Attendance is calculated at 20pts/10 classes. See “Excused Absences” below for more.
- 20% of your grade will be determined by **discussion board assignments**, which will include **summarizing central ideas**, and a **mini peer review**.
- 30% of your grade will be determined by **Essay 1**. (Due Sunday 2359 hrs, 08/21.)
- 30% of your grade will be determined by **Essay 2**. (Due Sunday 2359 hrs, 09/04.)

Grade scale:

A+ : ≥ 97	A : ≥ 93	A- : ≥ 90
B+ : ≥ 87	B : ≥ 83	B- : ≥ 80
C+ : ≥ 77	C : ≥ 73	C- : ≥ 70
D : ≥ 65	F : < 65	

Course Policies

Attendance

Live attendance is mandatory for anyone who has not contacted me beforehand with a valid reason for attending asynchronously. This is to facilitate a more fruitful discussion for those people who *do* attend the class synchronously. For anyone who does not have a valid excuse for attending asynchronously, this will affect your participation grade.

Important: For those who are attending asynchronously (for valid reasons), your participation will be graded based on an **additional short response** (~100 words) **per lecture** you are attending asynchronously: **you should pick a question or topic that interested you in that lecture and write a brief response to that topic or question, including your thoughts or any questions you have about that topic.**

Each reading response should be submitted **no later than 2 days after the lecture you are responding to**, via email to eychua@ucsd.edu.

Example: Your reading response for a Monday lecture should be emailed to me no later than Wednesday 2359hrs.

During Class

Since this class is strictly remote, our only form of contact will be via the use of Zoom. As such, you are **required to leave your webcams on, especially during discussions, except when you experience an unforeseen technical mishap**. This is to encourage paying attention during class, which is both to your benefit, and to the class’s benefit as a whole. We all know how easy it is to be distracted when on Zoom. Except when asking questions, discussing, or answering questions, **your mics should be muted**.

Office Hours

Since this class will not have sections, and there will not be much time for feedback and questions otherwise, you are **highly encouraged to come for our office hours** (mine and Nate's).

Paper Submissions

Essays should always be **submitted electronically via Canvas**. Any and all submitted work may be run through turnitin.com.

Excused Absences

If you obtain an excused absence for a day, you will not be deducted any points for participation and attendance. However, **the days you miss will no longer count towards your total number of attendance and partition points**. So, to put it concretely, each day is initially worth 2pts (20 points/10 classes) of your total grade. However, if you receive an excused absence for one day, each remaining day will then be worth approximately 2.22pts (20 points/9 classes), and so on.

Late Work

My preference is to be as flexible as possible. However, given that this is a summer session course, there is almost no time to catch up on past-due work. It's critical, therefore, that you complete assignments on time. Late assignments will **only be allowed for students with approval from their TA before the due date**. **Note that sending an e-mail without confirmation is not acceptable**. Turning in late work without penalty after the due date is only possible with a substantiated and good excuse (i.e. sickness, substantial disruption at home, and so on).

Late work without an approved excuse is automatically subject to a grade penalty of a third of a grade for every 24 hours period after the due date (that is, approximately, 3.3% of the value of the assignment per 24hour period after the assignment was due). **After a week, the assignment becomes an automatic 'F'**, but it must be submitted because:

- all assignments must be turned in to pass the class and
- a 59% F is better than a 0% F.

Note also that assignments that are handed in late without an extension will be graded and returned after those that were completed on time and will not receive comments.

Other Information

Discrimination and harassment

The University of California, in accordance with applicable federal and state laws and university policies, does not discriminate on the basis of race, color, national origin, religion, sex, gender, gender identity, gender expression, pregnancy (including pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition, genetic information, ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services (including membership, application for membership, performance of service,

application for service, or obligation for service in the uniformed services). The university also prohibits harassment based on these protected categories, including sexual harassment, as well as sexual assault, domestic violence, dating violence, and stalking. The nondiscrimination policy covers admission, access, and treatment in university programs and activities. If students have questions about student-related nondiscrimination policies or concerns about possible discrimination or harassment, they should contact the Office for the Prevention of Harassment Discrimination (OPHD) at (858) 534-8298.

Campus policies provide for a prompt and effective response to student complaints. This response may include alternative resolution procedures or formal investigation. Students will be informed about complaint resolution options.

A student who chooses not to report may still contact CARE at the Sexual Assault Resource Center for more information, emotional support, individual and group counseling, and/or assistance with obtaining a medical exam. For off-campus support services, a student may contact the Center for Community Solutions. Other confidential resources on campus include Counseling and Psychological Services, Office of the Ombuds, and Student Health Services. CARE at the Sexual Assault Resource Center 858.534.5793 | sarc@ucsd.edu | <https://care.ucsd.edu>

Disabilities

If you need arrangements or accommodations, please do not hesitate to notify me. If you have any needs, questions, or concerns you think I should be aware of, email me about it and I am happy to discuss them.

If you specifically have an Authorization for Accommodation (AFA), please share it with me as soon as you have it. Whatever the case may be, sooner is better than later for setting-up arrangements or accommodations.

Students requesting accommodations and services for this course due to a disability need to provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD) prior to eligibility for requests. Receipt of AFAs in advance is necessary for appropriate planning for the provision of reasonable accommodations. OSD Academic Liaisons also need to receive current AFA letters if there are any changes to accommodations. For additional information, contact the Office for Students with Disabilities: 858-534-4382 (V); 959.534.9709 (TTY) – reserved for people who are deaf or hard of hearing; or email: osd@ucsd.edu. For more, see: <http://disabilities.ucsd.edu>.

Academic Integrity

Integrity of scholarship is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual to whom it is assigned, without unauthorized aid of any kind. Plagiarism in this course is ordinarily grounds for failing this course.

Each student is responsible for knowing and observing the UCSD rules concerning academic integrity and plagiarism. Familiarize yourselves and be cognizant of your responsibilities and rights under the UCSD Policy on Integrity of Scholarship: <http://senate.ucsd.edu/manual/appendices/appendix2.pdf>.

A student found to have violated the university's academic integrity standards will be subject to penalties ranging from failing the assignment or course to suspension or expulsion from the university, and an academic misconduct charge will be noted on your academic record. If you have any questions about what constitutes plagiarism and how to avoid it, or how to credit the work of others properly, or how to evaluate sources for quality and reliability, or about any other pertinent issue, speak with your professor or TA. Ignorance of these standards will not be accepted as justification for their violation, so be sure to understand and abide by them.

Technology Support

For these matters, a helpful resource is UCSD's ITS website: <https://ucsd servicedesk.service-now.com/its>.

Email Policy

We are happy to reply to emails, but do give both me and the TA at least 24hrs to respond. Note that response times are likely to be longer on the weekend.

Other Helpful Resources

Writing Hub: <https://writinghub.ucsd.edu/for-undergrads/index.html>
(campus resource for writing assistance, offers online writing tutoring remote workshops)

CAPS: <https://wellness.ucsd.edu/CAPS/Pages/default.aspx>
(campus resource for issues about mental health and well-being)