

# PHIL 12: Scientific Reasoning

John Dougherty

Winter 2017

---

|          |  |             |  |
|----------|--|-------------|--|
| Lecture: | MW 12:00–12:50, CSB 002                                  | TA:         | Richard Vagnino  |
| OH:      | MW 2:00–3:00 (& by appt.)                                | Email:      | <a href="mailto:rvagnino@ucsd.edu">rvagnino@ucsd.edu</a>     |
| Email:   | <a href="mailto:jedoughe@ucsd.edu">jedoughe@ucsd.edu</a> | Discussion: | A01, M 3:00–3:50, SOLIS 111<br>A02, W 10:00–10:50, SOLIS 110 |
|          |  | OH:         | T 1:00–3:00  |

---

## Course description

In this course we will discuss what counts as evidence in science and how to decide how good that evidence is. The first half of the course reviews different kinds of arguments and evidence used in science. Sometimes we have enough evidence to be certain, but usually we do not. How do we quantify our uncertainty in these situations? More importantly, how do we decide what to do and believe when we're uncertain? We will apply tools from statistics to understand how scientific experiments are designed and evaluated in light of these questions. In the second half of the course we will apply what we've learned to reflect on the role of science in society and problems with food science, polling, alternative medicine, and science reporting.

## Materials

The textbook for this course is *Scientific Thinking* by Robert M. Martin. It is available at the bookstore. Other readings will be made available on TED.

## Accessibility

I am committed to making this course accessible to everyone. If you need academic accommodations, please contact the Office for Students with Disabilities at [osd@ucsd.edu](mailto:osd@ucsd.edu) or <http://disabilities.ucsd.edu> for more information about how the accommodation process works. I encourage you to come talk to me about your accommodations. If you have an Authorization for Accommodation letter, please present it to me and to Nancy Guerrero in the Philosophy department as soon as possible.

## Evaluation

There will be three assignments due in lecture, an in-class exam, and a paper due during finals week. Full descriptions of the assignments will be posted to the TED site. For dates see the schedule below.

**Assignments** These will be submitted in lecture, and are worth 8%, 14%, and 20% of your course grade, respectively. There is a letter grade penalty for all work received between the due date and the following Friday, and a further letter grade penalty for work received the following Monday. No work will be accepted more than one week after the due date.

**Exam** There will be an in-class essay for which you will write short essays on two questions regarding inductive reasoning. I will give you five questions ahead of time, three of these will appear on the exam, and you will select two to write on. This is worth 33% of your course grade.

**Final paper** You will write an essay in the style of a newspaper article of 1000 words. This will be submitted to Turnitin by the end of the scheduled exam period. It is worth 20% of your course grade.

**Section attendance** Attendance at discussion sections is required, and it is worth 5% of your final grade.

Each assignment will be graded on a 12 point scale, corresponding to the following letter grades:

|    |    |   |    |   |    |   |    |
|----|----|---|----|---|----|---|----|
| 12 | A+ | 9 | B+ | 6 | C+ | 3 | D+ |
| 11 | A  | 8 | B  | 5 | C  | 2 | D  |
| 10 | A- | 7 | B- | 4 | C- | 1 | F  |

Your course grade will be computed using the weights above, and (if necessary) will be curved *upward* so that the top 25%–30% of students receive an A, the next 25–35% a B, and the next 25%–30% a C. Grades will not be curved down.

## Academic integrity

We will all abide by the standards of academic honesty in this course, especially those laid out in [UCSD's Policy on Integrity of Scholarship](#). All of the academic work you submit will be your own, without aid of any kind. If you have any questions whatsoever about the demands of academic integrity in this course please ask me.

## Schedule

| Week   | Date | Topic                          | Due   |
|--------|------|--------------------------------|-------|
| 1      | 1/08 | Introduction and overview      |       |
| 1      | 1/10 | Introduction to argument       |       |
| 2      | 1/15 | <i>MLK, Jr. Holiday</i>        |       |
| 2      | 1/17 | Deductive arguments            |       |
| 3      | 1/22 | Inductive arguments            |       |
| 3      | 1/24 | Inductive generalization       | A. #1 |
| 4      | 1/29 | Confidence level               |       |
| 4      | 1/31 | Statistical significance       |       |
| 5      | 2/05 | Causation                      |       |
| 5      | 2/07 | Mill's methods                 |       |
| 6      | 2/12 | RCTs                           |       |
| 6      | 2/14 | Animal testing 1               | A. #2 |
| 7      | 2/19 | <i>Presidents' Day Holiday</i> |       |
| 7      | 2/21 | Animal testing 2               |       |
| 8      | 2/26 | Exam                           |       |
| 8      | 2/28 | Food science 1                 |       |
| 9      | 3/05 | Food science 2                 |       |
| 9      | 3/07 | Alternative medicine           | A. #3 |
| 10     | 3/12 | The scope of RCTs              |       |
| 10     | 3/14 | Replication                    |       |
| Finals | 3/21 | Paper due by 2:30PM            |       |