

PHIL 12: Logic and Decision Making

Syllabus

Fall 2008

Meeting time: MWF 3–3:50

Location: Center Hall 216

Course website: <http://thehangedman.com/teaching/phil12/>

Primary Instructor: Matthew J. Brown

Office Hours: MW 1:30–2:30pm, H&SS 7017 (subject to change)

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Teaching Assistant: Lisa Paschall

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Course Description

The goal of this course is to teach you how to understand, evaluate, and engage in successful inquiry. Since science usually exemplifies inquiry operating in the best fashion at a given time, the central focus of the course will be an understanding of the basics of the scientific process. The scientific process differs significantly from the picture that most scientific papers present, as well as most portrayals in the popular press. We will examine the complex pattern of scientific inquiry, including the processes of observation, reasoning, and experimentation that comprise it, as well as the formal methods that scientists use to assist them in these tasks. We will look at several cases from the history of science which exemplify various parts of the scientific process. We will close with a discussion of the processes of policy-making and personal decision-making on the basis of scientific evidence.

Science plays an enormously influential role in our society. As a social institution, it commands enormous respect and social influence, as well as vast sums of funding. It produces results that are greatly sought after, for both good and ill. At the same time, science generates great controversy when it collides with various religious, economic, and educational agendas. The adjective “scientific”

garners almost immediate respectability to whatever it applies to, and, in some circles, it is a prerequisite for being taken seriously. Yet to many it also bespeaks alienation, abstraction, and a void of meaning; to many people, science is quite intimidating. As a result of this course, students should become more comfortable with science and better able to understand, examine, and evaluate its claims. The course also aims to make the power of scientific inquiry available to students in their everyday lives.

Books

Required

- HWK: *How We Know: An Examination of the Scientific Process*
- S1: *Science Firsts*

Several readings will be provided via electronic course reserves at <http://reserves.ucsd.edu>

Recommended

These books provide additional readings and problem-sets for the topics of this course, but they are not required and you will not be tested on their contents. (Some selections from these books have been assigned and put on e-reserves; these are required and you will be tested on them.)

- USR: *Understanding Scientific Reasoning*
- C: *Creativity for Critical Thinkers*
- BG2: *A Beginner's Guide to Scientific Method* (Second Edition)
- BG3: *A Beginner's Guide to Scientific Method* (Third Edition)
- RA: *A Rulebook for Arguments*

Requirements

Your grade will be determined by the following:

- **Homework** - You will have three short homework assignments throughout the quarter, due at the beginning of lecture on 10/27, 11/10, and 12/1 (all Mondays). 30%
- **Midterm Exam** - A mid-course examination of the materials for the first part of the course. 20%

- **Final Exam** - A comprehensive examination on the material of the course. 40%
- **Section** - Your attendance in section, the quantity and quality of your contribution to discussions and activities therein. 10%
- **Extra Credit** - TBA. EC assignments will bump up grades close to the borderline at the instructor's discretion. (e.g., a high C+ bumped up to a B-, a high A bumped to an A+, etc.)

Section

The purpose of section is to expand upon the themes discussed in class, discuss them with your peers and your TA in a somewhat more intimate setting than the lecture. While your TA will work through examples and occasionally provide clarifications of the lecture and reading material, the bulk of section will be devoted to discussion and various learning and diagnostic activities. Each week for section there will be one or two chapters assigned from Robert Adler's *Science Firsts* by your TA. For week one, you will read about the birth of Greek science in chapters 1 & 2. One way to learn about something is to see it in action, and these short histories provide examples of the actual practice of science. They will be used by your TA to exemplify and compliment points made in lecture. This material is not optional and you may be quizzed on it. There will be no other homework for section.

You will be graded on attendance and participation in section, including but not limited to quantity and quality of contributions to discussion, scores on any reading quizzes, and contribution to small-group and class activities.

Attendance

Attendance is mandatory. Roll will not be called, and there will not be pop quizzes, but it will be practically impossible to learn the key material without attending lecture. Many things that are covered in lecture will not be in the readings, and no slides or lecture notes will be provided. Those students who have difficulty with note-taking from spoken lecture are encouraged to make an audio recording of the lecture.

Evaluation Standards

The following is a clarification for the purposes of this course of UCSD's official policy with respect to grading standards.

- An **A** grade indicates *excellent* work. It shows a comprehensive and in-depth knowledge of the material. An **A** essay has something to say and

says it well. It displays a subtle and nuanced understanding of the material, develops arguments clearly and effectively, and reflects insightfully on the course material. An **A** often rises above other work in terms of creativity and sophistication, or it may add something valuable to the discussion that goes beyond merely fulfilling the letter of the requirements. Only few, minor mistakes are present.

- A **B** grade indicates *good* work. Such work displays a clear understanding of the material, is thoughtful and careful, and essays develop arguments consistently towards a clear claim. The presence of serious errors must not impair the clarity of an argument or the overall understanding of a text. **B** work is in many ways successful, but lacks the sophistication, depth, coverage, or originality of **A** work.
- A **C** grade indicates *adequate* work. It shows an adequate understanding of the key parts of the material. Essays aim at a central claim, though they may rely on unsupported or insufficiently developed ideas. More serious errors may be present, so long as the central issues are not lost or an overall understanding of the material is not undermined.
- Work which deserves a grade less than **C** will display some of the following problems: it fails to show adequate understanding of the text; it fails to understand the assignment; it fails to articulate a coherent or adequate argument; it fails to reflect on the content of the course; it displays such pervasive grammatical errors as to be highly obscure in meaning.

Class Schedule

Recommended readings will be provided at a later date on the course webpage.

Day	Topic	Readings
F 9/26	Introduction: What is Science?	HWK: Ch 1, Recommended: <i>SM2:1, SM3:1, USR:1</i>
M 9/29	Scientific Papers & The Scientific Process	Medawar, "Is the Scientific Paper a Fraud?"
W 10/1	The Scientific Process: Problem-Solving	Dewey, <i>How We Think</i> (excerpts)
F 10/3	The Scientific Process: Background	Dewey, <i>How We Think</i> (excerpts), HWK: Ch. 12–13
M 10/6	The Scientific Process: The Pattern of Inquiry	Recommended: Dewey, <i>Logic</i> (excerpt)
W 10/8	The Scientific Process: Facts and Ideas	Dewey, <i>How We Think</i> (excerpts) HWK: Ch. 2
F 10/10	<i>Study Day / Review Session</i>	—
M 10/13	Midterm Exam	—

Day	Topic	Readings
W 10/15	Case History: Cholera	HWK: 3
F 10/17	Case History: Cholera	HWK: 4
M 10/20	Case History: Heat	HWK: 4
W 10/22	Case History: Insanity*	HWK: 5
F 10/24	<i>No Class</i>	<i>Writing Day</i>
M 10/27	Case History: Insanity	HWK: 5
W 10/29	Reasoning: Hypotheses	HWK: 11
F 10/31	Reasoning: Theories & Generality	HWK: 7
M 11/3	Reasoning: Reframing the Problem	Weston, "Reframing Problems" (C: 5)
W 11/5	Reasoning: Judgment & Understanding	HWK: 6
F 11/7	Reasoning: Common Errors & Fallacies*	Weston, "Fallacies"
M 11/10	Experiment: Testing	HWK: 8
W 11/12	Experiment: Confounds	HWK: 9
F 11/14	Experiment: Problems of Measurement	HWK: 10
M 11/17	Formal Methods: The Role of Mathematics	HWK: 14
W 11/19	Formal Methods: Probability and Statistics	HWK: 15–16
F 11/21	Formal Methods: Probability and Statistics	HWK: 15–16
M 11/24	Formal Methods: Causation and Correlation	"Establishing Causal Links" (BG3: Ch. 5)
W 11/26	Formal Methods: Causation and Correlation	"Establishing Causal Links" (BG3: Ch. 5)
F 11/28	<i>Thanksgiving Holiday</i>	—
M 12/1	Decision-Making: Formal Strategies	"Models of Decision-Making" (USR: 9)
W 12/3	Decision-Making: Balancing Values	Handout
F 12/5	Decision-Making: Policy-Making and Inquiry	Handout
TBA	Final Exam	—