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PHIL 211.01: Introduction to Logic - Inductive and Scientific Reasoning

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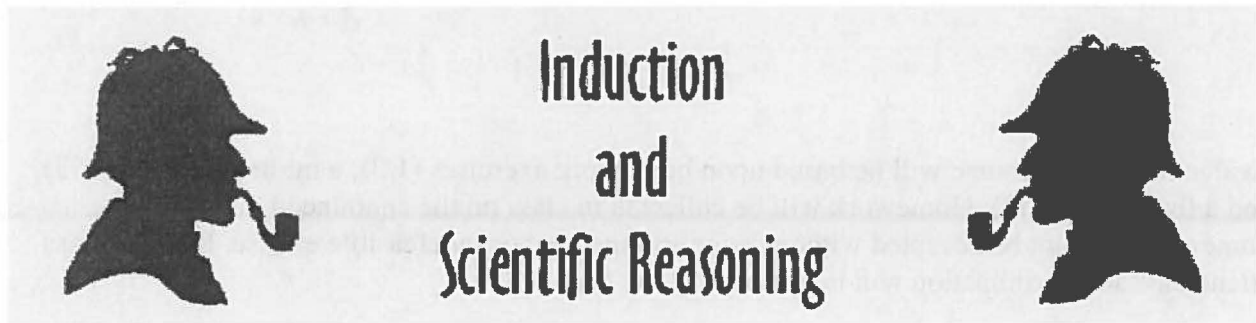
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PHIL 211
Spring, 2003

This course will provide an introduction to the centrally important elements of inductive reasoning employed in science and everyday life. We will consider both the principles for good reasoning and examples of the ways in which reasoning in this area commonly goes astray. We will first consider in a general and informal way just what should be counted as "good reason" for a belief about the way things are in the world (*How to Think about Weird Things*). We will review a number of the kinds of popularly held beliefs that fail to be supported by good reason—inexplicable ship and plane wrecks in the Bermuda Triangle, construction of the pyramids and other early "wonders" by visiting space aliens, regression to past lives, etc.—and assess how the reasons provided for such beliefs differ from those provided for a properly scientific claim, such as the claim that the continents have drifted across the face of the earth through geologic time. While no tidy formula for what should count as "good reason" can be given, our considerations will establish some general guidelines and a helpful perspective for sifting the wheat from the chaff in such matters. We will consider also some of the natural cognitive foibles of the human mind, both as a means of appreciating why we tend so often to go astray in our reasoning and as an aid to guarding against such foibles (*How We Know What Isn't So*). Upon completion of this section of the course, the student should be able to provide reasoned ground for rejecting facile relativisms, to assess the value of personal experience as evidence, to distinguish an absence of absolute proof from a basis for reasonable doubt, and to carry through a systematic assessment of the nature and strength of the evidence in support of a claim.

In the second part of the course, we will focus attention on the logic of inquiry employed in systematic scientific investigation (*Scientific Thinking*). Here we will examine not only the basics of the logic of scientific theories and their support, but as well the grounding logic of elementary statistical inference as it is employed in many areas of science, both natural and social. Because statistically grounded claims are so commonly encountered these days—claims regarding everything from the health benefits of broccoli and red wine to the proportion of UM students and faculty believing in God—it is necessary for the well-informed person to understand the logic underlying statistical inference if he or she is to be able to distinguish good from bad or inadequate reasoning concerning any number of potentially important matters. Upon completion of this section of the course, the student should understand the basic logic of causal explanation and experimental design, understand the difficulties of research outside the lab in such areas as health and social change, and understand the logic of elementary statistical inference procedures and the assumptions on which they are based.

★ OVER ★

Evaluation for the course will be based upon homework exercises (1/3), a midterm project (1/3), and a final exam (1/3). Homework will be collected in class on the announced due date; late homework will not be accepted without prior arrangement or infeasible excuse. Regular class attendance and participation will be expected.

Texts: *How to Think about Weird Things*, Theodore Schick & Lewis Vaughn
How We Know What Isn't So, Thomas Gilovich
Scientific Thinking, Robert Martin

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Office hours: MTW 2:30-3:30, F 10-12 & by appointment

Last day to drop a class or change grading status: Mar. 10 (Feb.14 to avoid financial penalty)