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PHIL 211.01: Introduction to Logic - Inductive and Scientific Reasoning

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PHIL.211 - INDUCTION AND SCIENTIFIC REASONING

Spring, 2001

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.

In the first part of the course, (Schick & Vaughn text) we will 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. 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 grounded 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.

In the second part of the course, (Moore text) we will focus attention on the one area where something like a formalization of the notion of an inductively established "good reason" can be given, the area of statistical inference. Our goal here will not be to master the formulae and the calculating techniques of the practicing statistician, but to come to an understanding of the underlying logic of elementary statistical inference. 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. Many of you no doubt either accept or doubt this or that "latest scientific study" or "recently conducted poll" without any well-grounded understanding of why one should either accept or doubt such reports; this course should help to provide such an understanding.

Evaluation for the first part of the course will be based upon a series of homework projects and reports (40% of course grade), and evaluation for the second part of the course will be based upon homework exercises and projects (30%) and a final exam (30%; 10:10, May 15). Homework will be collected in class on the announced due date; late homework will not be accepted without prior arrangement or indefeasible excuse. Regular class attendance and participation will be expected.

Texts: *How to Think about Weird Things*, Theodore Schick & Lewis Vaughn
Statistics: Concepts and Controversies, David Moore

Instructor: Burke Townsend
Office: LA 101

Office hours: Daily 2-3 & by appointment
Phone: campus - 6233; home - 549-9083

Last day to drop a class or change grading status: Mar. 12 (Feb. 16 to avoid financial penalty)