HU3700 Philosophy of Science Syllabus Fall 2002

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Course Objectives:
This course will examine some questions about science that are usually thought of as philosophical in nature (e.g., the nature of scientific inquiry, role of experimentation, what should count as confirming evidence, the nature of a scientific law and of scientific explanation, the structure of scientific theories, etc.). The Copernican Revolution will be studied in some detail to serve as a case study. Other historical examples will be included as appropriate. The course will concentrate on the nature of science as originally developed by logical positivism and on the nature of scientific revolutions. Additional topics will come from the Readings text.

Texts:
Carl Hempel, Philosophy of Natural Science
Thomas Kuhn, The Structure of Scientific Revolutions, Third Edition
Theodore Schick, Readings in the Philosophy of Science

Course Requirements:
1. Three essay type hour exams, each worth 25% of the course grade. The first hour exam will be on September 27, the second on November 1, and the third at the regularly scheduled final exam time.

2. Five or six quizzes based on lectures and assigned readings. Quiz average worth approximately 15 % of the course grade.

3. Five short (2-3 pages) papers summarizing several chapters in the Kuhn book. Paper due dates will be announced in class. Papers will be graded satisfactory/unsatisfactory. Failure to submit five satisfactory papers will result in an automatic “F” for the course. Unsatisfactory papers may be revised and resubmitted.

4. Regular class attendance and participation in discussion is expected. If you miss class, you are responsible for finding out what was assigned, covered or discussed in your absence. Class attendance and participation is worth 10% of the course grade.

Reading and Topic Sequence:

Hempel, Chapter 1 “Scope And Aim of This Book”
   The Goals of Science

Hempel, Chapter 2, “Scientific Inquiry: Invention and Test”
   Case Study: Semmelweis
   Hypothetical Deductive Model
   Asymmetry of Confirmation and Disconfirmation
Contexts of Discovery vs. Justification
Objectivity in Science
Mill’s Methods of Discovery

Hempel, Chapter 3, “The Test of a Hypothesis: Its Logic and Force”
Pierre Duhem, “The Underdetermination of Scientific Theories,” in Schick, Part 2
Karl Popper, “Science as Falsification.” in Schick, Part 1
Experimental vs. Non-experimental Sciences
Duhem’s Thesis
The Problem of Demarcation
Crucial Experiments
*Ad Hoc* Hypotheses
Testability-in-Principle
Verifiability Theory of Meaning

Case Study: The Copernican Revolution

Hempel, Chapter 5, “Laws and Their Role in Scientific Explanation”

Scientific Explanation
Deductive-Nomological Explanations
Universal Laws vs. Accidental Generalizations
Probabilistic Explanations
Probabilistic Laws

Hempel, Chapter 6, “Theories and Theoretical Explanation”

Internal vs. Bridge Principles
Observable vs. Non-observable Entities
The “Mountain Top” Conception of Scientific Progress
Scientific Realism vs. Instrumentalism (Anti-Realism)

Kuhn, All except the Postscript

One or two Parts of the Schick text as determined by the class.

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