Philosophy 216: Philosophy of Science

In this course, we will examine a number of issues that arise from philosophical reflection on the practice of science. These include: the nature of scientific theory change; the role that values play in scientific inquiry; the relationship between observation and theory; the confirmation of scientific theories; the nature of scientific explanation and natural laws; the debates between scientific realism and antirealism; and the distinction between science and pseudoscience.

Course objectives:

The aim of this course is for students to be able to:

1. Articulate a detailed overview of issues in the philosophy of science.
2. Write papers which include the careful explication of theories in the philosophy of science and the formulation of relevant, compelling arguments for or against these theories.
3. Understand how issues in the philosophy of science relate to other disciplines and other areas of philosophy.
4. Engage in reasoned, charitable philosophical discourse.
5. Demonstrate improved philosophical writing.

Required texts:

Martin Curd and Jan Cover, *Philosophy of Science: The Central Issues*
Peter Godfrey-Smith, *Theory and Reality: An Introduction to the Philosophy of Science*
Thomas Kuhn, *The Structure of Scientific Revolutions*

Schedule of Readings and Assignments

Articles marked with an '*' are on Moodle (available through the college's portal). All other articles are in *Philosophy of Science: The Central Issues*. Readings in this book can be supplemented by Curd and Cover's Introductions and Commentaries, which begin and end each section of their book.

January 23 Introduction

<u>*Logical Positivism and Empiricism*</u>

January 25 Philosophy 216 Syllabus
Theory and Reality, Chapter 1

January 27 *Theory and Reality*, Chapter 2

January 30 Duhem, "Physical Theory and Experiment"

February 1 *Schlick, "Positivism and Realism"

<u>*Induction and Confirmation*</u>

February 3 *Theory and Reality*, Chapter 3

February 6 *Hume, "Skeptical Doubts"
Goodman, "The New Riddle of Induction"

February 8 Lipton, "Induction"
Optional: *Hempel, "Studies in the Logic of Confirmation"

Laws and Explanation

February 10 *Theory and Reality*, Chapter 13
*Hume, "On the Idea of Necessary Connection"
Carnap, "The Value of Laws"

February 13 Hempel, "Two Basic Types of Scientific Explanation"
Hempel, "The Thesis of Structural Identity"

February 15 Railton, "A Deductive-Nomological Model of Probabilistic Explanation"

Popper and Demarcation

February 17 *Theory and Reality*, Chapter 4
Popper, "Science: Conjectures and Refutations"

February 22 Kuhn, "Logic of Discovery or Psychology of Research?"
Lakatos, "Science and Pseudoscience"

February 24 Thagard, "Why Astrology is a Pseudoscience"
*Elliott Sober, "Intelligent Design Theory and the Supernatural"

February 27 **First 5-page paper due**
**Seeking God in Science*, 11-46

Scientific Theory Change

March 1 *Theory and Reality*, Chapter 5

March 3 *The Structure of Scientific Revolutions*, Chapters I-IV

March 6 *The Structure of Scientific Revolutions*, Chapters V-VII

March 8 **Midterm Exam**

March 10 *Theory and Reality*, Chapter 6

Spring Break

March 27 *The Structure of Scientific Revolutions*, Chapters VIII-X

March 29	*The Structure of Scientific Revolutions*, Chapters XI-XIII
March 31	Kuhn, "Objectivity, Value Judgment, and Theory Choice"
April 3	*Thagard, "The Best Explanation: Criteria for Theory Choice"
April 5	*Theory and Reality*, Chapter 7
April 7	*Feyerabend, "How to Defend Society Against Science"

Feminist theory, science, and naturalism

April 10	Longino, "Values and Objectivity"
April 12	No class
April 14	**Second 5-page paper due** No class
April 17	*Theory and Reality*, Chapters 8-9
April 19	Okruhlik, "Gender and the Biological Sciences"
April 21	*Longino, "Can There be a Feminist Science?" *Beldecos et al., "The Importance of Feminist Critique for Contemporary Cell Biology"
April 24	*Theory and Reality*, Chapters 10-11
April 26	*Hanson, "Observation" *Fodor, "Observation Reconsidered" Optional: *Churchland, "Perceptual Plasticity and Theoretical Neutrality" Optional: *Fodor, "Reply to Churchland"

Reductionism, Scientific Realism, and Antirealism

April 28	*Theory and Reality*, Chapter 12
May 1	Maxwell, "The Ontological Status of Theoretical Entities"
May 3	van Fraassen, "Arguments Concerning Scientific Realism"
May 5	Laudan, "A Confutation of Convergent Realism" Optional: *Ruhmkorff, "Global and Local Pessimistic Metainductions"
May 8	*Stanford, "Realism, Pessimism, and Underdetermination" Optional: *Ruhmkorff, "Some Difficulties for the Problem of Unconceived Alternatives"

May 10	Carrier, "What is Right with the Miracle Argument"
May 12	**7-page paper due** *Theory and Reality*, Chapters 14-15