

PHI 3400 PHILOSOPHY OF SCIENCE

Dr. Nicholas Power

Course Overview: This course introduces the student to major philosophical issues surrounding science and scientific explanation such as ‘What demarcates science from non- or pseudo-science?’; ‘How are scientific hypotheses or theories confirmed (and justified) and how and when do theory changes come about?’; the realism/antirealism debate; reductionism and the unity of science; as well as philosophical questions about fundamental assumptions made in specific sciences. This course will show both the richness and variety of modern science and its techniques as well as the multi-part yet interdisciplinary nature of contemporary philosophy of science. There is a broad range of perspectives on how science does what it does and how it has come to replace both the priests and the philosophers as the final arbiter of what is. Central to these perspectives is the realization that scientist are people too—that they, like us, cannot leave their experiences, histories, psychological idiosyncrasies, cultural biases, or even their genders at the door of the office. No prior knowledge of philosophy or logic is required for this course. However, some of what you will read will be most challenging. This is due to both the technical nature of discussions within the sciences and the inherently abstract and open-ended kind of epistemological and metaphysical questions to which these discussions give rise and which define the *philosophy* of science.

Required Texts: Robert Klee: *Introduction to the Philosophy of Science*
Robert Klee, Editor: *Scientific Inquiry: Readings in the Philosophy of Science*
Various Articles on Reserve at Library

Outline of Study:

General Overview – Philosophy of Science vs. History; Sociology or Psychology of Science; Explanation vs. Prediction

Positivism – Empiricism vs. Rationalism; Logic and the Linguistic Nature of Theories

Criticisms of Logical Positivism- Observational vs. Theoretical Terms; Dispositional Properties; Holism; The Underdetermination of Theory; Falsificationism; Pragmatism vs. Realism

The Goals of Science Theories of Explanation – Varieties of Reductionism; The Unity of Science Program; Functional Properties; The Deductive-Nomological Theory of Explanation and its Criticisms; Causation and Explanation; The Pragmatics of Explanation

Post-Positivism; Kuhn and Beyond – Kantian Idealism and Kuhn; Kuhnian Paradigms and Paradigm Shifts; Historicism and Social Constructivism; Relativism and Anti-realism

Feminism, Neo-Positivism, and Scientific Realism – Feminist Critiques on Philosophy of Science; Arguments for and against Scientific Realism; van Fraassen’s Instrumentalism; Laudan’s Anti-realism

The Philosophy of Biology: Mendel and Crick and Watson – Classical and Molecular Genetics; Reductionism in Biology; Varying Models of Evolutionary Selection Process; Genic Selectionism, Darwinian Theory; Population Genetics; Realism vs. Anti-realism in Evolutionary Explanation

The Philosophy of Physics: Quantum Strangeness – Static and Dynamic Properties of Subatomic Reality; Wave Particle Duality; Heisenberg’s Uncertainty Principle; Schroedinger’s Cat; The EPR Paradox and Bell’s Inequalities; Possible Worlds and Consciousness

The Philosophy of Psychology – From Soul to Mind; The Future of Folk Psychology Debate; Eliminative Materialism; Intentional Instrumentalism and Scientific Realism

The Philosophy of the Social Sciences – Human vs. Natural Sciences; The ‘Verstehen Tradition’

Homework and Exams: You will be required to write either 3, short (about 1-2 typed pages) response papers on assigned reading materials, or a historical research/term paper (8-12 pages) on a topic approved by the instructor. There will be weekly quizzes based on the reading assignments and a Final exam.

Grading Policy: The grade in this course will be determined as follows:

Class Participation	10%
Response Papers/Term Paper	30%
Weekly Quizzes	30%
Final Exam	30%

Class Participation: Class participation includes attendance and ‘Role’ will be taken at the start of each class meeting. More than 3 unexcused absences (or a chronic tardiness condition) in the first half of the course will result in a recommendation that you withdraw from the course. Contributions in class develop your own understanding of the material as well as stimulate the thinking of others. Grades for both quizzes and response papers will drop one-third of a letter grade for each calendar date they are late (or an entire letter grade for each class meeting). All University policies concerning **withdrawal** from the course, **plagiarism** and other forms of cheating, etc. are in full effect. Consult your *Student Handbook* for details.