PHIL 0065 - INTRODUCTION TO THE PHILOSOPHY OF SCIENCE

Catalog Description

Advisory: Eligibility for ENGL 1A
Hours: 54 lecture
Description: The philosophical foundations of science such as criteria for distinguishing between science and pseudo-science, questions concerning scientific progress, justification of scientific hypotheses, the theory-dependence of observation, the nature of scientific revolutions, the possibility of objectivity and the challenges of relativism, feminism and marginalization. (CSU, UC)

Course Student Learning Outcomes

- CSLO #1: Describe and analyze the relationship between philosophy and science.
- CSLO #2: Evaluate descriptions of scientific methodology.
- CSLO #3: Describe, compare and contrast the logic of science with focus on verificationism, falsificationism, realism, and nominalism.
- CSLO #4: Communicate effectively orally or in writing on a topic in philosophy of science

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

54

Outside of Class Hours

108

Total Student Learning Hours

162

Course Objectives

Through oral and written activities, students will:
1. Describe and appraise criteria for theories being scientific;
2. Identify and present examples of theories as either scientific or pseudoscientific found in popular media;
3. Compare and contrast knowledge production within scientific traditions as opposed to knowledge production within non-scientific traditions;
4. Examine and evaluate philosophical positions concerning:
a) the justification of induction,
b) the limitations of falsification techniques,
c) the theory dependence of observation,
d) the social practice of science versus the ideals of science,
e) the possibility of objectivity,
f) feminist, gay/lesbian, race-identified, and marginalized criticisms of the philosophical foundations of both the social practice of science and ideal science;
5. Identify and evaluate the social constructionist approach to truth;
6. Explain feminist approaches to science;
7. Employ feminist research theory to critique examples of scientific experiments;
8. Describe the value and role of scientific inquiry in knowledge production.

General Education Information

- Approved College Associate Degree GE Applicability
  - AA/AS - Literature & Language
- CSU GE Applicability (Recommended-requires CSU approval)
  - CSUGE - C2 Humanities
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
  - IGETC - 3B Humanities

Articulation Information

- CSU Transferable
- UC Transferable

Methods of Evaluation

- Classroom Discussions
  - Example: Instructor will lead students in discussions about the characteristics of a scientific theory. After a thorough list of characteristics has been derived, instructor will distribute a list of claims to students and ask them to evaluate whether these claims could be scientific theories. If not, students should identify which characteristic is missing.
- Objective Examinations
  - Example: Students will demonstrate familiarity with the important philosophers of science by responding to objective questions, e.g. (Standard Grading) 1. Sir Karl Popper's most important contribution to the Philosophy of Science was: A. Verificationism B. Falsificationism C. Paradigm Science D. Each of the above was a contribution by Sir Karl Popper
- Projects
  - Example: Professors may assign projects for students such as: Assuming that one treats the Biblical text of Genesis as science, design a potential scientific study that could potentially falsify the creation myth of Genesis.
- Reports
  - Example: Instructor will ask students to describe and apply the problem of induction to examples in written papers of at least five pages in length.

Repeatable

No

Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. Students will read sections from Hume's, Treatise of Human Nature, and An Enquiry Concerning Human Understanding that describes the problem of induction. Instructors will guide students as they work in small in-person groups or in an online discussion forum defining concepts, summarizing Hume's argument, and evaluating Hume's critique of induction as it relates to scientific methodology.

Distance Learning

1. Instructor will lecture in-person or in an online video on the characteristics of a scientific theory and how they contrast against non-falsifiable causal claims. After a thorough list of characteristics has been identified, instructor will distribute a list of claims to students and ask them to evaluate whether these claims could be scientific theories. Students will be asked to identify observations that would falsify the causal claim, and for non-scientific causal claims identify which characteristic is missing.

Typical Out of Class Assignments
Reading Assignments

1. Read the chapter from your Philosophy of Science text book on Popper's Falsificationism and be prepared to discuss in class. 2. Read the book, "Monkey Girl" and be prepared to discuss the role of falsificationism in the trial described in "Monkey Girl."

Writing, Problem Solving or Performance

1. The Triumph of Evolution and the Failure of Creationism by Niles Eldredge Evolution vs Creationism Chart Instructions: Construct a poster-board size chart explaining Creationist Criticisms of evolutionary theory as well as the scientific responses to these criticisms. The titles of the criticisms appear below. Note that you must thoroughly explain the criticisms as well as the response to it. Your chart will be graded based upon organization, clarity, specificity, and neatness. Below is a sample chart for your consideration. Your chart must address each of the following criticisms. 1. Science and Religion are alternative belief systems and we should let the kids decide which they prefer. 2. Evolution is just a theory and it is challenged more and more. 3. Evolution is not science since it makes no predictions a. Events in the past are not subject to experimental verification or falsification. b. Few biologists will predict the next evolutionary step because evolution has no prediction-ability. 4. Science has not yet fully solved the riddle of how life originated. 5. The Cambrian Explosion shows that gradual evolution did not take place. 6. What about the gaps in the fossil record? 7. Evolution violates the second law of thermodynamics. 8. The Earth is not all that old. a. Dating of the earth is circular. 9. What about Polystrate fossils? 10. What about fossils and rocks found to be out of sequence? 11. What about the evidence for Noah's flood? 12. Genesis says that each was made according to its own KIND. (The Creationist problem with 'kinds') 13. Microevolution is acceptable but not Macroevolution 14. What about Homo erectus? (Creationist Problem) 15. The Scientific Problem of Philosophical Naturalism 2. Instructions: Describe and critically evaluate the role of human psychology in scientific advancement as presented in the book It Started With Copernicus. Apply this role to the example of evolution. Your response should be an argumentative essay with a clearly defined thesis and supporting argumentation. The paper should be written for an unsympathetic audience and, hence, provide as much empirical justification and rational explanation as possible.

Other (Term projects, research papers, portfolios, etc.)
Required Materials

- Philosophy of Science: A New introduction
  - Author: Gillian Barker and Phillip Kitcher
  - Publisher: Oxford University Press
  - Publication Date: 2014
  - Text Edition:
  - Classic Textbook?:
  - OER Link:
  - OER:
- The Structure of Scientific Revolution: 50th Anniversary Edition
  - Author: Thomas S. Kuhn
  - Publisher: Oxford University Press
  - Publication Date: 2012
  - Text Edition:
  - Classic Textbook?:
  - OER Link:
  - OER:
- The Meaning of Science: An Introduction to the Philosophy of Science
  - Author: Tim Lewens
  - Publisher: Basic Books
  - Publication Date: 2016
  - Text Edition:
  - Classic Textbook?:
  - OER Link:
  - OER:
- A Tale of Seven Scientists and a New Philosophy of Science
  - Author: Eric Scerri
  - Publisher: Oxford University Press
  - Publication Date: 2016
  - Text Edition:
  - Classic Textbook?:
  - OER Link:
  - OER:
- Philosophy of Science: A Contemporary Introduction
  - Author: Alex Rosenberg and Lee McIntyre
  - Publisher: Routledge
  - Publication Date: 2019
  - Text Edition: 4th
  - Classic Textbook?:
  - OER Link:
  - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.