



Course Syllabus

Intro to the Philosophy of Science: Can Science Solve All Our Problems?

Course Summary:

This class will lead students to a deeper understanding of science itself – not its specific disciplines like physics, chemistry or biology, for example – but rather what science is, as well as what it is not; what it can do, and what it cannot do.

Course Experience:

The disciplines of science have brought to humanity, many good and important things. The practice of scientific methods by scientists has given us cures to serious diseases; helped us understand how our planet's environment works; has enabled us to leave earth and start to explore space. Using scientific principles, science have solved many significant problems that we face as human beings. Medical advancements have given us disease defeating techniques; amazing drugs to defeat disease; medical surgical techniques that have helped alleviate the suffering of millions of people, to name but a few.

However, science has its limits. Science cannot solve some problems, and some would argue, it cannot solve some of the most important issues we face as human beings. Some have argued that science has provided some of the worst things humanity has come to possess, like nuclear bombs. Furthermore, some have argued that science cannot solve humanity's greatest problems, like human conflict.

In this class, students will get introduced to the philosophy of science, and explore the following:

- A brief history of the major scientific discoveries and the people who made them;
- Explore answering the question, 'what is science'?
- Explore various methods of scientific reasoning;
- Explore the tension between Realism and Anti-Realism;
- Examine scientific driven change and scientific revolutions;
- Explore the problems in physics, biology and psychology;
- A brief exploration of science and ethics;

Take a hard look at some scientific assumptions and attempt to answer the question, 'should we take that as fact?' The class will endeavor to assist the student in having a proper view of science – what it can do and what it cannot do. For if someone believes that science can solve a problem that in fact it cannot, then the solution will likely be hidden and people will waste time applying the wrong solution.



Learning Objectives Include:

- Students will learn what the philosophy of science is, and how it can ‘look’ at science from a higher vantage point than from within a discipline of science.
- Students will learn of some of the most famous scientists in history and what they contributed to our understanding of the world we live in.
- Students will learn the basic concepts of the issues that the philosophy of science deals with.
- Students will learn that science – while it provides many important benefits to human kind – does have limitations, and understanding those limitations is very beneficial to solving problems.

Prerequisites & Age & Ability Recommendations:

It is recommended that the student take *The Art of Arguing* prior to this course. This course gets into some advanced topic and reasoning well will help the student understand the concepts. This course is appropriate for very advanced 8th grade level children to adults.

Content Review by Week:

Brief Science History or What Led to Modern Science? (Week 1)

- The exploration of ‘what exactly is science’? This exploration will include a brief history of major scientific discoveries and the men who made them, and a look at scientific reasoning and its important role in trying to understand ‘what is science’.

Scientific Reasoning and Key Concepts: (Week 2)

- What is the basis of good, scientific reasoning, and is it different than reason or logic applied in other domains?
- The foundation of inductive reasoning and its surprising weaknesses.

What is a Scientific Explanation (Week 3)

- One of the most important aims of science is to try and explain what happens in the world. But what does it mean to say that a phenomenon can be ‘explained’ by science? This question has exercised philosophers since Aristotle, but this week’s lesson will look closely at American philosopher Carl Hempel’s views on scientific explanation.



Realism versus Anti-Realism: (Week 4)

- There is a very ancient debate in philosophy between two opposing schools of thought called realism and idealism. Realism holds that the physical world exists independently of human thought and perception. Idealism denies this – it claims that the physical world is in some way dependent on the conscious activity of humans. We will look at the key issues in this debate, seek to understand the arguments for scientific realism and anti-realism, and come to conclusions as to which view is better.

Scientific Change & Revolutions; Classic Philosophical Problems in Physics, Biology and the Social Sciences: (Week 5)

- Changes in scientific understanding and technology used to practice science happen in a relatively fast way. What are the implications of this fact? Does fast introduce greater uncertainty?
- What is a scientific revolution? How does one measure that, and what is its implication on the practice of science and on our lives as common citizens of this earth?
- Significant questions remain in regard to major theories advocated by physicists, biologists and social scientists. We will look at some of these.

What are the Implications of the Problems and Limitations in Science: (Week 6)

- We will review science's problems and weaknesses and reach some firm and clear conclusions as to what science can and cannot do.

What Items or materials are provided with the course?

- This syllabus.
- A student version of each class's content will be made available prior to the class on the Materials page for the class on the web site, so students don't have to take notes (creating a logic account on the web site is required to access these documents).
- Homework is not required but will be provided upon student's request. If a student requests homework, the answers will also be available in documents on the Materials page for the class on the web site, so students don't have to take notes (creating a logic account on the web site is required to access these documents).
- It is recommended that students purchase the book, "***Philosophy of Science: A Very Short Introduction***" by Samir Okasha, Oxford University Press. The course is loosely based on that book.