# DOWNLOAD PDF INTRODUCTION TO THE HISTORY AND PHILOSOPHY OF SCIENCE

## Chapter 1 : Philosophy of science - Wikipedia

*The courses offered by the Department of History and Philosophy of Science (HPS) furnish resources to achieve this. Students are trained to employ techniques from history, philosophy and the social sciences.*

Pre-modern[ edit ] The origins of philosophy of science trace back to Plato and Aristotle [28] who distinguished the forms of approximate and exact reasoning, set out the threefold scheme of abductive , deductive , and inductive inference, and also analyzed reasoning by analogy. The eleventh century Arab polymath Ibn al-Haytham known in Latin as Alhazen conducted his research in optics by way of controlled experimental testing and applied geometry , especially in his investigations into the images resulting from the reflection and refraction of light. Roger Bacon â€" , an English thinker and experimenter heavily influenced by al-Haytham, is recognized by many to be the father of modern scientific method. In this philosophy[,] propositions are deduced from the phenomena and rendered general by induction. The 19th century writings of John Stuart Mill are also considered important in the formation of current conceptions of the scientific method, as well as anticipating later accounts of scientific explanation. Logical positivism Instrumentalism became popular among physicists around the turn of the 20th century, after which logical positivism defined the field for several decades. Logical positivism accepts only testable statements as meaningful, rejects metaphysical interpretations, and embraces verificationism a set of theories of knowledge that combines logicism , empiricism , and linguistics to ground philosophy on a basis consistent with examples from the empirical sciences. Seeking to overhaul all of philosophy and convert it to a new scientific philosophy, [34] the Berlin Circle and the Vienna Circle propounded logical positivism in the late s. Thereby, only the verifiable was scientific and cognitively meaningful, whereas the unverifiable was unscientific, cognitively meaningless "pseudostatements"â€"metaphysical, emotive, or suchâ€"not worthy of further review by philosophers, who were newly tasked to organize knowledge rather than develop new knowledge. Logical positivism is commonly portrayed as taking the extreme position that scientific language should never refer to anything unobservableâ€"even the seemingly core notions of causality, mechanism, and principlesâ€"but that is an exaggeration. Talk of such unobservables could be allowed as metaphoricalâ€"direct observations viewed in the abstractâ€"or at worst metaphysical or emotional. Theoretical laws would be reduced to empirical laws, while theoretical terms would garner meaning from observational terms via correspondence rules. Mathematics in physics would reduce to symbolic logic via logicism, while rational reconstruction would convert ordinary language into standardized equivalents, all networked and united by a logical syntax. A scientific theory would be stated with its method of verification, whereby a logical calculus or empirical operation could verify its falsity or truth. In the late s, logical positivists fled Germany and Austria for Britain and America. The logical positivist movement became a major underpinning of analytic philosophy , [35] and dominated Anglosphere philosophy, including philosophy of science, while influencing sciences, into the s. Yet the movement failed to resolve its central problems, [36] [37] [38] and its doctrines were increasingly assaulted. Nevertheless, it brought about the establishment of philosophy of science as a distinct subdiscipline of philosophy, with Carl Hempel playing a key role. The Structure of Scientific Revolutions In the book The Structure of Scientific Revolutions , Thomas Kuhn argued that the process of observation and evaluation takes place within a paradigm, a logically consistent "portrait" of the world that is consistent with observations made from its framing. A paradigm also encompasses the set of questions and practices that define a scientific discipline. He characterized normal science as the process of observation and "puzzle solving" which takes place within a paradigm, whereas revolutionary science occurs when one paradigm overtakes another in a paradigm shift. More than one logically consistent construct can paint a usable likeness of the world, but there is no common ground from which to pit two against each other, theory against theory. Each paradigm has its own distinct questions, aims, and interpretations. Neither provides a standard by which the other can be judged, so there is no clear way to measure scientific progress across paradigms. For Kuhn, the choice of paradigm was sustained by rational processes, but not ultimately determined by them. The choice between paradigms involves setting two or more "portraits" against the world and deciding which likeness is most promising. For Kuhn, acceptance or rejection of a paradigm is a social process as much as a logical process. That is, the choice of a new paradigm is based on observations, even though those observations are made against the background of the old paradigm. These assumptionsâ€”a paradigmâ€”comprise a collection of beliefs, values and techniques that are held by a given scientific community, which legitimize their systems and set the limitations to their investigation. The scientific method is to be used to investigate all reality. Nevertheless its very existence is assumed. As infants we made this assumption unconsciously. People are happy to make this assumption that adds meaning to our sensations and feelings, than live with solipsism. For the most part, science is the discovering and explaining of the external world. The benefit of SRS is that the investigator is guaranteed to choose a sample that represents the population that ensures statistically valid conclusions. Coherentism Jeremiah Horrocks makes the first observation of the transit of Venus in , as imagined by the artist W. Lavender in In contrast to the view that science rests on foundational assumptions, coherentism asserts that statements are justified by being a part of a coherent system. Or, rather, individual statements cannot be validated on their own: As explained above, observation is a cognitive act. That is, it relies on a pre-existing understanding, a systematic set of beliefs. An observation of a transit of Venus requires a huge range of auxiliary beliefs, such as those that describe the optics of telescopes, the mechanics of the telescope mount, and an understanding of celestial mechanics. If the prediction fails and a transit is not observed, that is likely to occasion an adjustment in the system, a change in some auxiliary assumption, rather than a rejection of the theoretical system. Quine , it is impossible to test a theory in isolation. The investigations that followed led to the discovery of an eighth planet, Neptune. If a test fails, something is wrong. But there is a problem in figuring out what that something is: Instead, he favored a "survival of the fittest" view in which the most falsifiable scientific theories are to be preferred. He argued that "the only principle that does not inhibit progress is: Because of this, he said it was impossible to come up with an unambiguous way to distinguish science from religion , magic , or mythology. He saw the exclusive dominance of science as a means of directing society as authoritarian and ungrounded. Sociology of scientific knowledge According to Kuhn, science is an inherently communal activity which can only be done as part of a community. Others, especially Feyerabend and some post-modernist thinkers, have argued that there is insufficient difference between social practices in science and other disciplines to maintain this distinction. For them, social factors play an important and direct role in scientific method, but they do not serve to differentiate science from other disciplines. On this account, science is socially constructed, though this does not necessarily imply the more radical notion that reality itself is a social construct. However, some such as Quine do maintain that scientific reality is a social construct:

## Chapter 2 : Worldviews: An Introduction to the History and Philosophy of Science by Richard DeWitt

*Worldviews is a well-written, well-organized, and interesting introduction to the philosophy of science, both present and past. DeWitt's particular strength is summarizing in clear and concise language the history of the philosophy of science.*

Graduate study Info Technology, medicine and the sciences shape and dominate much of modern life. Many get specialist training in these fields. Even more people live in a world where the results of scientific inquiry and technical programmes matter. The challenges of learning and applying scientific techniques and principles raise fundamental and exciting questions about our ways of understanding the world. It is crucial that as citizens we are as well equipped as possible to understand and debate how these enterprises work and what they mean. We need to know how the sciences achieved their position in our society. We must be able to make sense of the processes of scientific knowledge, technological projects and medical strategies. We should be able to see how and why these enterprises exert their powers and how they are trusted, contested and changed. Students are trained to employ techniques from history, philosophy and the social sciences. Students with a background in natural sciences or medicine learn how to put their work into its wider context and to ask more fundamental questions about their approach and achievement. Those from history, philosophy and the social sciences learn more about the essential roles and developments of the sciences, medicine and technology in the world. With these techniques, they are taught how to follow the ways in which sciences, technology and medicine changed and how to appreciate the way they function now. Many of the most urgent public problems facing us now rely on very basic claims about how we get reliable knowledge and whom we should trust. Fraught debates about the causes of climate change or the safety of genetically modified foods, about the validity of techniques drawn from complementary medicine or the authority of evolutionary explanations of human behaviour, all involve deep questions about the character of dependable knowledge. Courses in HPS help students think about these questions as they occur in the major debates around the sciences. Such controversies often call on citizens to ask about the truth of the claims made by scientists, medical practitioners or technologists. We can examine whether the sciences are in fact in the business of providing certain truths about the world, or whether, instead, their task is just to generate better predictions. Many current conflicts, whether in health care or engineering, in criminology or ecology, involve assertions and assumptions about the underlying causes of apparently evident effects. So as scientists and citizens we need to understand the diverse ways in which causation works. We also inquire about how different authorities have given reasons to trust what scientists say. This requires us to figure out the conditions for accepting some claim about nature and to see how persuasion works. Often, we rely on what others tell us. HPS programmes offer many fascinating approaches to understanding what is going on in such cases. So we depend on good pictures of the sources and methods by which we find out about the world. For a long time, the sciences have been taken to be the model of secure knowledge. Students in HPS learn how to explore such models and how they have changed. These changes have taken place in surprising and provocative ways. HPS courses study models of knowledge across many societies and periods. There are many more systems of making knowledge than those pursued in modern technological societies. So students can learn about the knowledge systems and practical enterprises of other cultures, including classical China, ancient Mesopotamia or medieval Christendom. One vital aim is to explore the world-views of other communities, to make sense of approaches very different from those of industrial societies. Students also examine how these systems acquire their impressive power to act in the world. This means we have to ask why it is believed that the sciences are in fact such a potent way of understanding the world around us. The task of scientific understanding has been, and is now, achieved through a range of very contrasting approaches. These include experiment and measurement, meditation and observation, classification and artistry. In different places and at different times highly variable methods have been put to work to establish how nature works and to manage and manipulate it. The purposes that guide human communities in the development of natural knowledge and of sophisticated techniques are also highly disparate. It makes a difference if nature is seen as a result of divine creation or instead as a vast, self-sustaining machine. It also makes a difference if the trustworthy interpreters of nature are treated as priests or as engineers. So one of the most important questions about the sciences is their relation with the wider social system. Technologies and sciences in the modern world rely on massive networks of social organisation and communal enterprise. One way of thinking about the sciences is to treat them as institutions, then study the groups that make knowledge work, check its validity, train its practitioners and give it value. HPS courses help students learn how to apply this approach to the sciences, to medicine and to technology. These courses let students debate the urgent questions of the collective and individual character of reliable knowledge and effective technique. The same kinds of fascinating and important issues arise in medical experience. Different peoples give very contrasting senses to the principal events of human life and death. Students of HPS explore how the medicalisation of these events was effected. They study the relations between notions of well-being and health, social life and individual fate, as models of medical intervention and of the human body have been contested, revised and developed. There have been close connexions between attitudes to technologies and to medical strategies. These have shaped the status of physicians and health carers, they matter to the condition of men and women in society and to the imagination of what counts as a good life. Courses in HPS allow students to investigate these fundamental social, ethical and historical problems and to learn how to analyse the condition of the biomedical world and its meanings. The HPS department offers its students the chance to gain important insights about the condition of the sciences, of technology and of medicine. It also trains them in techniques of interpretation and argument, communication and critical analysis. These are indispensable skills throughout the Tripos. They are also increasingly valuable in an epoch when social, biomedical and environmental transformations pose such major challenges to public knowledge and expert authority. Graduates from the Department have successfully won places as researchers and activists, science educators and journalists, exhibition curators and media professionals and experts in science and technology policy. Join us in this programme! Suggested reading To find out more about HPS, try some of these books: Collins and Trevor Pinch, The Golem: Diagram of a foetus by Justin Dittrich Siegmund, Image credit:

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## Chapter 3 : Introducing History and Philosophy of Science | Undergraduate study | HPS

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Examples from history of science illustrate different views about science. Topics may include the relations between the sciences and between science and religion. This course offers a historically informed examination of some of the central issues in the philosophy of science. We begin by discussing the very nature and definition of science. Then, with particular cases from the history of scientific thought in mind, we explore some of the most important questions that philosophers of science discuss today. We will study philosophical problems connected with thought experiments, confirmation and disconfirmation of theories, falsifiability and pseudoscience, induction, explanation, empirical equivalence and underdetermination, realism, and other related themes. In typical weeks where we have all three scheduled class times and no tests, etc. Thus, students will be expected to participate throughout the entire class time each week. Although I will assign plenty of reading that helpfully summarizes the writings of the great thinkers we will discuss, most of our readings in this course will come straight from those thinkers themselves -- Aristotle, Ptolemy, Copernicus, etc. That means that the reading in this course will often be difficult, but it also means that if you do it carefully and come to understand it, you will be rewarded! To keep up with this course and to get the most out of our class times, you must do the assigned reading slowly and carefully before each class time. I cannot stress enough that you will not be able to do well in this course unless you take the reading requirements seriously! Given that this is the case, and given the difficult nature of many of our readings, I have taken some measures to help you along with the readings. Most importantly, I will provide you with reading guides. These guides will give you advice on a the material on which you should most focus, b the order in which you should do the various readings as well as when you should have them done by, and c how you should understand key concepts that occur in the readings. In addition, these guides will give you a list of questions to think about as you do the reading. Please do follow these guides closely each week as you do the assigned reading. An Historical Anthology Wiley - Blackwell,  This text collects together most of the readings that we will study from the history of scientific thought. You are required to have the 2nd edition of this book; the earlier edition does not include a good deal of our required reading. Note that this book has not changed in content since its original publication in -- with the exception of a new foreword by Walter Isaacson added in the most recent printing. The cover, on the other hand, has changed many times. The upshot is that you can buy whatever printing of this text that you like, regardless of whether the cover looks like the one pictured here.

## Chapter 4 : History and Philosophy of Science - Fall - Syllabus

*Worldviews: An Introduction to the History and Philosophy of Science is an ideal text for those coming to the history and philosophy of science for the first time. Covers the key historical developments and philosophical themes and topics that have impacted upon our scientific view of the world.*

## Chapter 5 : Project MUSE - Introduction: History of Science and Philosophy of Science

*Book Description. Worldviews: An Introduction to the History and Philosophy of Science is an ideal text for those coming to the history and philosophy of science for the first time.*

## Chapter 6 : History and Philosophy of Science | University of Pittsburgh

*Represents an innovative introduction to the history andphilosophy of science, designed especially for those coming to thesubject for the first time Updated new edition features the addition of chapters focusingon scientific laws, evolutionary* *theory, and implications ofevolution.*

## Chapter 7 : SparkNotes: Philosophy of History: Summary

*Richard DeWitt, Worldviews: An Introduction to the History and Philosophy of Science, 2nd Edition (Wiley - Blackwell, ). You are required to have the 2nd edition of this book; the earlier edition does not include a good deal of our required reading.*