UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Philosophy of Science

2324-2-E2401P064

Learning area

Interdisciplinary competences.

Learning objectives

Knowledge and understanding
• Developing a critical point of view on scientific research and the historical development of knowledge and techniques.
• Understanding the genesis, the validation and the obsolescence and/or the turnover of scientific theories and hypotheses in historical and critical perspective.
• Understanding which views can / cannot be considered scientific on the basis of different scientific criteria.
• Providing a qualifying philosophical, scientific and cultural background.

Applying knowledge and understanding
• Giving well-rooted and in-depth direction to scientific knowledge.
• Interdisciplinarity.
• Recognizing the relationships between different fields of psychological knowledge.

Contents

Course title > **Space. History and philosophy of a concept**

The course is divided into two distinct but complementary parts.

1. The first part aims to provide, from a historical-critical perspective, a set of basic knowledge that characterises the philosophy of science, such as the nature and function of scientific laws and theories, the structure of explanation, prediction and inferences aimed at the acquisition of scientific knowledge, the relationship between hypotheses and observational evidence and the question of scientific realism. Moreover, after some general considerations on the relationship between science, the philosophy of science and the history of science, the broad panorama of the different interpretations and positions taken on the fundamental problems faced by Western science in its historical development from the Greek world to the 20th century will be outlined: the Pythagorean-Platonic and Aristotelian theories of science; the first atomistic hypotheses; the natural philosophy of the Middle Ages; the scientific revolution; the new methodological instances of Bacon and Descartes; Newton's axiomatics; empiricist and Kantian epistemology; 19th-century positivism and conventionalism; the best-known theories on the development of scientific knowledge.

2. The second (monographic) part is aimed at deepening the thematic order addressed in the general part in the light of one of the essential concepts of the Western philosophical and scientific tradition, that of *space*, conceived in a physical, metaphysical, mathematical, theological and psychological sense. In this respect, some fundamental theoretical nuclei will be identified, through which it will be possible to read the historical and semantic evolution of this concept, from Greeks to Einstein's theory of general relativity, highlighting its characteristics, affinities, differences and possible application implications.

Detailed program

General part:

• Preliminary remarks on the history and philosophy of science.
• The Pythagorean-Platonic scientific ideal.
• Aristotle's philosophy of science.
• Philosophy and mathematics in the Greek world: from the Pythagoreans to Archimedes.
• Methodological perspectives in the Middle Ages.
• The debate on "saving phenomena" in the Modern Age.
• The scientific ideal of Galilei, Bacon and Descartes.
• Newton's axiomatic method.
• Empiricism, rationalism and the Kantian solution.
• John Stuart Mill's inductivism.
• Positivism, conventionalism and logical empiricism.
• Popper and falsificationism.
• Theories of scientific progress (Kuhn, Lakatos, Laudan).
• Feyerabend's methodological anarchism.

Monographic part:

• Preliminary considerations on the concept of space.
• Space, nature and motion in Greek thought and in the Middle Age.
• The new Renaissance cosmologies and the problem of infinite space.
• Space and matter in Descartes.
• Newton's absolute space and Leibniz's critique.
• Space in English empiricism and in Kant.
• Non-Euclidean geometries and the problem of space.
• The field concept in Faraday and Maxwell's electromagnetism.
• Space-time in Einstein's theory of relativity.

Prerequisites

Basic knowledge (high school) of the history of Western philosophical thought.

Teaching methods

Teaching methods consist in direct exposure, group discussion, analysis of historically and scientifically significant texts, the development of experiences and/or exercises, and in-depth studies of a seminar nature. **Class attendance is strongly recommended**.

Assessment methods

The verification of learning will be carried out through a written test with open questions. The questions are aimed at testing the effective acquisition of the topics illustrated during the course, as well as to ascertain the ability to manage the contents of the proposed bibliography and the capability to critically deal with them. Upon student's request, the exam can be integrated by an oral examination, on all the course topics.

There is no midterm exam.

Textbooks and Reading Materials

Foreign students should contact the lecturer to arrange textbooks and reading materials in English or French.

Sustainable Development Goals

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