GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2023-2024

History and Philosophy of Sciences: Mathematics (C004084)

Course size *(nominal values; actual values may depend on programme)*

Credits 6.0 **Study time 165 h**

Course offerings and teaching methods in academic year 2023-2024

A (semester 1)	Dutch	Gent	seminar
			lecture
			group work

Lecturers in academic year 2023-2024

Van Dyck, Maarten	LW01	lecturer-in-charge
Beck, Pieter	LW01	co-lecturer
Thas, Koen	WE01	co-lecturer
Van Maldeghem, Hendrik	WE01	co-lecturer

Offered in the following programmes in 2023-2024	crdts	offering
Master of Science in Teaching in Science and Technology(main subject Mathematics)	6	A
Master of Science in Mathematics	6	A

Teaching languages

Dutch

Keywords

Science, history, scientific methods, philosophy of science, history of mathematics

Position of the course

This course offers a general introduction to the history of science and to basic concepts of philosophy of science. (Additional courses focus on a particular scientific discipline: mathematics). Insight is gained into the specific characteristics of the scientific method and into the similarities and differences with non-scientific forms of acquiring knowledge. As such, this course also provides an understanding of several essential questions of the philosophy of science (e.g. the problem of demarcation, the problem of induction, the foundations of science, etc.).

Contents

The historical part of the course is devoted to the origins and history of scientific methods. Particular attention is paid to the development of mathematics in Ancient Greece (Thales, Pythagoras, Archimedes, Euclid and others). The Greek mathematicians' emphasis on proof is contrasted with other forms of knowledge acquisition and construction, such as mythology. The special character of philosophy, developed together with mathematics, is also explained, showing that already Plato and Aristotle had divergent views on methodological aspects of what was first called natural philosophy and later science. Next, the importance of Greek medicine (Hippocrates, Galenus) and of Arabic mathematics and science is discussed and situated in the medieval, theological traditions, after which the developments in the Renaissance are indicated (Copernicus, Vesalius, Harvey, Bruno, Bacon a.o.) The origin and evolution of the experimental method in physics is explained and placed in its historical and social context.

In second part focusses on further developments in mathematics. Attention is also paid to specific problems of the philosophy of science within these disciplines and to the possible social and ethical problems associated with them.

Initial competences

Bachelor in a scientific discipline.

Final competences

1 Understand how the sciences developed historically, how they gradually acquired their contemporary characteristics and what their distinguishing features and methodologies are.
2 Understanding the philosophical questions of science that constantly arise in the development of the sciences (What is reliable observation? How to derive a general understanding from a limited number of observations? What is a good experiment? What is a fact? A hypothesis? A theory? How are theories adjusted? etc.).
3 Understanding the historical roots of the sciences (Presocratic philosophers, Aristotle, Archimedes, Euclid and others).
4 Understanding the relationship between religion and science and of the issues relating to the emergence and development of the modern sciences (development of experimental methods, Francis Bacon, Copernicus, Vesalius, Galileo, Kepler, Newton, etc.).
5 Understanding the differences and possible similarities between scientific approaches and non-scientific forms of acquiring knowledge (dogmatic thinking, pseudoscience, etc.).
6 Acquiring detailed knowledge of the development of a specific discipline, in connection with the external factors that shaped it.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Group work, Seminar, Lecture, Independent work

Extra information on the teaching methods

We aim at a combination of (guided) self-study and project work, supported by the standard electronic educational tools.

Learning materials and price

Written syllabus

References

Course content-related study coaching

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Oral assessment, Written assessment

Examination methods in case of periodic assessment during the second examination period

Oral assessment, Written assessment

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

General part: Written examination
Domain specific part: Assignment and presentation

Calculation of the examination mark

50 % general part + 50% domain specific part