GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

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 2025-2026

null

Lecturers in academic year 2025-2026

Van Dyck, Maarten	LW01	lecturer-in-charge
Beck, Pieter	LW01	co-lecturer
Thas, Koen	WE02	co-lecturer
Van Maldeghem, Hendrik	WE02	co-lecturer

Offered in the following programmes in 2025-2026	**crdts**	**offering**
null		

Teaching languages

Dutch

Keywords

Philosophy of science, history of science, scientific evidence, scientific models, scientific theories, scientific research communties, expertise, history of mathematics

Position of the course

This course teaches the student to think about the natural sciences. We investigate some philosophical questions dealing with the relation between theories, models and their empirical evidence. The goal is to give the student insight in both the possibilities and the limits of scientific evidential reasoning by showing the importance of these philosophical ideas for a proper understanding of the history and contemporary practice of the sciences. Next to this, a few themes from the history of mathematics are discussed in more detail.

Contents

***General* part:** The first part (3 credits, taught in the first six weeks of the semester) introduces the central themesthrough a study of a few episodes from the history of chemistry that are exemplary for the dynamics of all scientific research. By placing the scientific research in its historical context it is shown how empirical observations can only play their evidential role given a number of "background assumptions". We describe how models are formulated for phenomena, based on these observations, and how these models in turn can be integrated withing more abstract theories. The cases discussed are: Lavoisier's oxygen hypothesis, the determination of atomic weights in nineteenth century chemistry, the concept of an element in the table of Mendeleev and the changing relations between chemistry and (sub-)atomic physics.
When describing these cases, we also pay attention to historical evolutions in the organisation of scientific research communities and how these make possible scientific research as a collective endeavor: from the amateurs at the academies of the eigteenth century to the professional scientists at research universities in the nineteenth century and twentieth century (hyper-)specialists. In a concluding class, we discuss the status of expertise in the context of applying scientific theories when dealing with social problems.
Domain-specific part: In the second half (three credits, second six weeks of the semester), students work in groups on a particular topic from the more modern

history of mathematics. Choice topics are provided, with some freedom given to students as well. Examples include the history of a particular important problem, discussing a particular period from the Middle Ages onward, explaining the work of a particular (historical) mathematician, examining the influence of a particular problem or person, investigating the historicity of a particular mathematical theme, comparing mathematical accuracy and writing styles in articles during a particular period, etc. The paper should be presented orally.

Initial competences

Bachelor in a scientific discipline.

Final competences

1 Being able to correctly explain the relations between empirical evidence, models and theories
2 Have insight in the historical developments of scientific research communities and being able to correctly assess the impact of these developments
3 Being able to acurately interpret the historical cases
4 Being able to develop nuanced reflection on the status of expertise
5 Develop a reflective attitude that can be incorporated in one's own scientific practice
6 Acquiring detailed knowledge of an important sub-aspect of the historical development of mathematics

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.

Study material

Type: Syllabus

Name: Syllabus'
Indicative price: Free or paid by faculty
Optional: no
Available on Ufora : Yes

References

Course content-related study coaching

Individual feedback by teaching staff.

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. No GAI-tools allowed.

Calculation of the examination mark

50 % general part + 50% domain specific part