GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

History and Philosophy of Sciences (C004009)

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

Credits 3.0 **Study time 90 h**

Course offerings in academic year 2026-2027

B (semester 2) Dutch Gent

Lecturers in academic year 2026-2027

Van Dyck, Maarten LW01 lecturer-in-charge

Offered in the following programmes in 2026-2027	crdts	offering
Bachelor of Science in Engineering Technology(main subject Chemical Engineering Technology)	3	B
Bachelor of Science in Engineering Technology(main subject Civil Engineering Technology)	3	B
Bachelor of Science in Psychology(main subject Theoretical and Experimental Psychology)	3	B
Master of Science in Teaching in Science and Technology(main subject Biochemistry and Biotechnology)	3	B
Master of Science in Teaching in Science and Technology(main subject Biology)	3	B
Master of Science in Teaching in Science and Technology(main subject Chemistry)	3	B
Master of Science in Chemistry(main subject (Bio)Organic and Polymer Chemistry)	3	B
Master of Science in Chemistry(main subject Analytical and Environmental Chemistry)	3	B
Master of Science in Electrical Engineering (main subject Communication and Information Technology)	3	B
Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)	3	B
Master of Science in Chemistry(main subject Materials and Nano Chemistry)	3	B
Master of Science in Biochemistry and Biotechnology	3	B
Master of Science in Biology	3	B
Master of Science in Chemical Engineering	3	B
Master of Science in Chemical Engineering	3	B
Master of Science in Civil Engineering	3	B
Master of Science in Civil Engineering	3	B
Master of Science in Electromechanical Engineering	3	B
Master of Science in Engineering Physics	3	B
Master of Science in Engineering Physics	3	B
Master of Science in Fire Safety Engineering	3	B
Master of Science in Geology	3	B
Master of Science in Geology	3	B
Master of Science in Materials Engineering	3	B
Master of Science in Mechanical and Electrical Systems Engineering	3	B
Master of Science in Sustainable Materials Engineering	3	B

Teaching languages

Dutch

Keywords

Philosophy of science, history of science, scientific evidence, scientific models, scientific theories, expertise

Position of the course

This introductory courses 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 (specifically, underdetermination and "theory-ladenness"). 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.

Contents

The central themes are introduced through 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. In a concluding class, we discuss the status of expertise in the context of applying scientific theories when dealing with social problems.

Initial competences

Basic familiarity with some central concepts and theories in the natural sciences.

Final competences

1 Being able to correctly assess the philosophical and scientific implications of underdetermination of theories by empirical evidence.
2 Being able to correctly assess the philosophical and scientific implications of theory-ladenness.
3 Being able to explain the impact of underdetermination in historical case studies.
4 Being able to explain the impact of theory-ladenness in historical case studies.
5 Develop a reflective attitude that can be incorporated in one's own scientific practice.

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

Lecture

Study material

Type: Syllabus

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

References

Course content-related study coaching

he teacher and his collaboraters provide individual feedback when necessary.

Assessment moments

end-of-term assessment

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

Written assessment with open-ended questions

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

Written assessment with open-ended questions

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Calculation of the examination mark

100% end-of-term evaluation