GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Extensions of the Standard Model (C003212)

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

Credits 6.0 **Study time 180 h**

Course offerings in academic year 2026-2027

A (semester 1)	English	Gent

Lecturers in academic year 2026-2027

Lowette, Steven	VUB	lecturer-in-charge
Skovpen, Kirill	VUB	co-lecturer
Tytgat, Michael	VUB	co-lecturer

Offered in the following programmes in 2026-2027	**crdts**	**offering**
Master of Science in Physics and Astronomy	6	A

Teaching languages

English

Keywords

Position of the course

Contents

We start with an overview of the problems of the Standard Model in being a complete theory of particle physics. Some experimental measured properties provide a strong constraint on the range of models to go beyond the Standard Model. We will discuss those both from the theoretical and experimental corner. This we use as a motivation to propose different models to overcome at least some of the problems of the Standard Model. Theoretically we discuss for example Grand Unification Theories and Supersymmetry, and we learn to make calculations within these models. We also discuss the experimental techniques which are relevant in the research of these models beyond the Standard Model.

Initial competences

A course on the Standard Model of particle physics, both at introduction and theoretical level. A course on the experimental aspects of particle physics and a course on the statistical processing of empirical data.

Final competences

1 The student has insight in the divers theoretical possibilities to expand the Standard Model of elementary particle physics.
2 The student knows the experiments and experimental techniques to test the correctness of the proposed models beyond the Standard Model.
3 The student is able to calculate and make interpretations within the framework of these models.
4 The student is able to propose experiments and experimental techniques to test these ideas empirically.

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

Seminar, Lecture

Study material

None

References

http://w3.iihe.ac.be/~jdhondt/Website/WebsiteCourses.html

Course content-related study coaching

Assessment moments

end-of-term assessment

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

Oral assessment

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

Oral assessment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

Oral exam with preparation (a theory part and an experimental part).

Calculation of the examination mark

Oral exam determines 100% of the final mark.