GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Astroparticle Physics (C002349)

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

Credits 6.0 **Study time 180 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 2)	English	Gent	seminar
			lecture

Lecturers in academic year 2024-2025

Ghosh, Archisman	WE05	lecturer-in-charge
Buitink, Stijn	VUB	co-lecturer

Offered in the following programmes in 2024-2025	crdts	offering
Master of Science in Teaching in Science and Technology(main subject Physics and Astronomy)	6	A
Master of Science in Physics and Astronomy	6	A
Master of Science in Physics and Astronomy	6	A
Exchange Programme in Physics and Astronomy (Master's Level)	6	A

Teaching languages

English

Keywords

Particle physics, high energy astronomy

Position of the course

This course gives an introduction in astroparticle physics, a discipline on the boundaries between cosmology, particle physics and astronomy. The emphasis is on the experimental methods used to detect the highest energy particles which reach Earth from cosmos.

Contents

- Quarks and leptons and their interactions
- The expanding universe
- Conservation rules and symmetries
- Dark matter and dark energy in the universe
- Cosmic particles
- Acceleration mechanisms
- Particle physics in the stars
- High energy cosmic rays
- Neutrino astronomy
- Gravitational waves

Initial competences

The courses "Subatomic Physics" and "Subatomic Physics II". "General Relativity" may be beneficial (but is not strictly necessary).

Final competences

1 The student knows the newest techniques that are being used in studies of the most energetic phenomena in the universe.
2 The student knows the most important unsolved problems in the field.

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

Type: Slides

Name: Lecture slides
Indicative price: Free or paid by faculty
Optional: no
Language : English
Available on Ufora : Yes

References

Course content-related study coaching

The lecturer can be reached by email, or through Ufora.

Assessment moments

end-of-term and continuous 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

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

- Weekly exercises: report on solved problem sets (numerical analysis in Python is required for some of the exercises)
- Presentation on a scientific paper relevant to the course material
- Oral exam focussing mainly on concepts and theory

Calculation of the examination mark

1/3 on exercises and presentations (continuous assessment); 2/3 on the final oral exam.