GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Galaxies (C004214)

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 2025-2026

A (semester 2)	Dutch	Gent	seminar
			lecture

Lecturers in academic year 2025-2026

De Looze, Ilse	WE05	lecturer-in-charge

Offered in the following programmes in 2025-2026	**crdts**	**offering**
Bachelor of Science in Mathematics	6	A
Bachelor of Science in Physics and Astronomy	6	A
Master of Science in Teaching in Science and Technology(main subject Mathematics)	6	A
Master of Science in Mathematics	6	A
Micro-credential Galaxies	6	A
Preparatory Course Master of Science in Physics and Astronomy	6	A
Preparatory Course Master of Science in Physics and Astronomy	6	A

Teaching languages

Dutch

Keywords

Galaxies, morphologie, stellar populations, stellar evolution and remnants, interstellar medium, dark matter, kinematics and dynamics.

Position of the course

This course unit belongs to the learning pathway "Astronomy" in the Bachelor program Physics and Astronomy.
The course is a continuation of the first bachelor course “Stars and planets”. The emphasis in this course will instead be on galaxies, and all their aspects: morphology, stellar populations and evolution, interstellar medium, kinematics, and the role of galaxies as building blocks of the Universe. The main goal is to gain insight into the fundamental astrophysical, dynamical and chemical processes that play a role in a galaxy's formation and evolution, and link these processes to observational tracers of galaxy properties.

Contents

- Star formation and stellar evolution (incl. remnants)
- Stellar populations
- Radiation processes
- Milky Way (incl. Local Group)
- Morphologie of galaxies
- The interstellar medium and observational tracers
- Kinematics and dynamics of galaxies
- Dark matter and alternatives

Initial competences

Successfully finished the course "Stars and Planets".

Final competences

1 Discern the different steps in the evolution of stars, including their remnants, of stars with different initial masses.

2 Recognise the characteristics, pro and cons of the different galaxy classification systems.
3 Understand the properties of stellar populations, and the different components of the interstellar medium.
4 Describe the general properties and formation history of the Milky Way (and the Local Group).
5 Place the evolution of galaxies in a broader context and link it to how the Universe has evolved.
6 Explain the fundamental kinematic and dynamic properties of galaxies.
7 Discern the different potential candidates of dark matter and interpret the different observational tracers of dark matter.
8 Select and analyse data related to a specific (extra-)galactic topic.
9 Make an oral presentation on an(extra-)galactic topic in the correct scientific terminology.

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

Extra information on the teaching methods

Lectures, project work, exercise tutorials

Study material

Type: Handbook

Name: Galaxies
Indicative price: Free or paid by faculty
Optional: no
Language : Dutch
Author : Prof. Dr. Ilse De Looze
Online Available : Yes
Available in the Library : No
Available through Student Association : No
Usability and Lifetime within the Course Unit : regularly
Usability and Lifetime within the Study Programme : one-time
Usability and Lifetime after the Study Programme : not
Additional information: De course material will be made available through Ufora during the first week of the lectures. The powerpoint presentations from each week's classes will also be shared via Ufora.

References

- An Introduction to Modern Astrophysics - ISBN 978-1-108-42216-1
- Galactic Dynamics: An Introduction - ISBN 0-6910-8445-9
- Physics and Chemistry of the Interstellar Medium - ISBN 978-1-891389-46-7

Course content-related study coaching

The theorical framework will be explained during the lectures. Guidance for exercises and model solutions will be given during the tutorials. The lecturer and tutor(s) can be approached after the lectures or via email for further clarifications.

Assessment moments

end-of-term and continuous 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

Examination methods in case of permanent assessment

Presentation

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

Theory: written exam
Exercises: written exam (closed book)
Project: oral presentation on a relevant astronomy topic from APOD (“Astronomy Picture of the Day”)

Calculation of the examination mark

Theory: 40% Exercises: 40% Presentation: 20%

Facilities for Working Students

Replacement assignment after consulting with the main lecturer.