

## 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**

[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 theoretical 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.