GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

Observational Techniques in Astronomy (C003131)

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)	English	Gent	seminar
			lecture

Lecturers in academic year 2025-2026

van der Wel, Arjen	WEO5	lecturer-in-charge
Nersesian, Angelos	WEO5	co-lecturer
van der Wel, Sharon Meidt	WEO5	co-lecturer

Offered in the following programmes in 2025-2026	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

Telescopes, detectors, photometry, spectroscopy, interferometry, data processing

Position of the course

This course focuses on astronomy as an observational science. Most attention is devoted to optical astronomy, but also radio astronomy is addressed. The course describes the properties of the current and future generation of telescopes, detectors and observatories, and introduces the most important observational techniques (photometry, spectroscopy and interferometry). An important goal of the course is to give the students a solid introduction to the art of optical data processing using professional data reduction software.

Contents

- Introduction
- Observatories and telescopes
- CCD detectors
- CCD calibration
- Photometry
- Astrometry
- Spectroscopy
- Introduction to radio astronomy
- Interferometry

Initial competences

Introduction to astronomy (C003016)
Extragalactic astronomy (C002994)

Final competences

1 Indicate the specific place of optical and radio astronomy within observational astronomy as a whole.
2 Explain the most important characteristics and constraints on observatories,

telescopes and detectors.
3 Understand the fundaments behind photometry, spectroscopy and astrometry.
4 Given an astrophysical question, select the most suitable observational technique and determine the instrumental requirements to investigate this question.
5 Be familiar with the proposal writing process.
6 Master the basic steps in the reduction of optical data using professional data reduction software.

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: Syllabus

Name: Syllabus'
Indicative price: Free or paid by faculty
Optional: no
Additional information: The syllabus consists of the slides shown during the lectures and available in electronic format.

References

- Astrophysical techniques - ISBN 0750309466
- Handbook of CCD astronomy - ISBN 0521852153
- Detection of light: From the ultraviolet to the submillimeter - ISBN 0521017106
- An introduction to radio astronomy - ISBN 9780521878081

Course content-related study coaching

The material is thoroughly explained during the lectures. The lecturers and teaching assistent are available for supplementary coaching.

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 with open-ended questions

Examination methods in case of permanent assessment

Oral assessment, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Extra information on the examination methods

The theory is evaluated periodically during a written exam. The students receive various assignments during the semester, including an oral presentation a proposal writing exercise and a big data analysis project. Students who fail for the practical work can only achieve a maximum score of 8/20 for the entire course. It is possible to redo the assignments in the second examination period.

Calculation of the examination mark

Theory: 30%
Data analysis project: 50%
Oral presentation: 20 %