

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 2023-2024

A (semester 2)

English

Gent

lecture

seminar

Lecturers in academic year 2023-2024

Nersesian, Angelos

WE05

lecturer-in-charge

Chastenët, Jérémy

WE05

co-lecturer

van der Wel, Arjen

WE05

co-lecturer

Offered in the following programmes in 2023-2024

Master of Science in Teaching in Science and Technology(main subject Physics and Astronomy)

crdts

6

offering

A

Master of Science in Physics and Astronomy

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 fundamentals 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

Learning materials and price

The syllabus consists of the slides shown during the lectures and available in electronic format.

Students are expected to have a computer available with a Linux or MacOS operating system. Windows systems are allowed, but no technical support can be provided for them.

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 assistant 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 %