

Advanced Remote Sensing (I003013)

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

Credits 5.0 **Study time 150 h**

Course offerings in academic year 2024-2025

A (semester 2) English Gent

Lecturers in academic year 2024-2025

Calders, Kim	LA20	lecturer-in-charge
Lievens, Hans	LA20	co-lecturer
Maes, Wouter	LA21	co-lecturer
Vancoillie, Fieke	LA20	co-lecturer

Offered in the following programmes in 2024-2025

	crdts	offering
Master of Science in Bioscience Engineering: Forest and Nature Management	5	A

Teaching languages

English

Keywords

Earth observation – data processing – remote sensing technologies – environmental monitoring

Position of the course

Remote sensing (RS) of the Earth is crucial as it offers a comprehensive view of our planet, aiding in monitoring environmental changes, from deforestation to urban expansion, enabling informed decision-making for conservation and resource management. Additionally, it plays an important role in disaster management or policy-making. This course aims to further advance students in the field of remote sensing. Through this course, you will gain both in-depth knowledge and practical skills in advanced topics that cover the physical principles of light interactions within vegetation canopies; 3D lidar applications to derive forest structure; active and passive microwave remote sensing of snow, soil moisture and floods; the use of AI within remote sensing, and forest cover/disturbance mapping. Throughout this course, you will work with a wide range of remote sensing data including optical, hyperspectral, radar and lidar data across multiple spatial and temporal scales.

Contents

- Module 1: Light interaction in vegetation canopies and RT for calibration/validation
- Module 2: Hyperspectral RS for plant health assessment
- Module 3: 3D LiDAR for forest structure
- Module 4: Active/passive microwave RS of snow, soil moisture and floods
- Module 5: AI for Earth Observation
- Module 6: Forest cover and disturbance mapping
- Company visit

Initial competences

This course builds upon specific competencies from the course Teledetectie

(I002450) or its equivalent

Final competences

- 1 Explain the interactions of light in vegetation canopies
- 2 Show awareness of emerging technologies and trends in advanced remote sensing
- 3 Apply AI techniques for processing and analyzing remote sensing data, including multispectral, hyperspectral, LiDAR, and RADAR data
- 4 Demonstrate a critical attitude toward the accuracy and reliability of remote sensing products and datasets

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, Excursion, Lecture, Independent work

Study material

None

References

Course content-related study coaching

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

Participation, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Calculation of the examination mark

Report excursion: 5% - Assignments: 5% - Oral exam: 90%

Students who eschew end-of-term and/or continuous assessment for this course unit may be failed by the examiner.