

Biological Raw Materials (I620028)

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

Credits 6.0 **Study time 180 h**

Course offerings in academic year 2024-2025

A (semester 1) Dutch Kortrijk

Lecturers in academic year 2024-2025

Werbrouck, Stefaan	LA21	lecturer-in-charge
Sleutel, Steven	LA20	co-lecturer

Offered in the following programmes in 2024-2025

Bachelor of Science in Bioindustrial Sciences	crdts	offering
	6	A

Teaching languages

Dutch

Keywords

Plant, residue streams, bioconversion, soil fertility

Position of the course

The course "Biological Resources" highlights various aspects within the biomass production chain, focusing on both the plants themselves and the residual streams they generate. The structure of plants is unraveled and their life cycle, from growth to senescence and death, is studied. This also includes crop preservation and the importance of optimal storage conditions. The diversity of vegetables and type crops from fruit, ornamental and forestry crops is explored. For each crop, the potential waste streams left behind after their processing are analyzed. To close the circle, soil fertility, nutrient management and the carbon cycle are also addressed. It then examines how residual flows from primary production and food residues can be put to good use by insects, fungi (mushrooms), earthworms and other organisms. Alternative biomass sources such as wood, grass, algae and seaweed are also covered. The course emphasizes circular aspects, with sustainability and efficient use of biological resources as core concepts.

Contents

The plant

- Anatomy: structure of plants
- Life cycle: from germination to flowering, fruiting and the circle that closes with the production of new seed.
- Preservation: optimal storage conditions to avoid waste
- A variegated diversity: vegetables, fruits, trees and more
- Vegetable families: diversity within the vegetable world
- Agriculture, fruit, ornamental and forestry: different cultivation methods and crops that make our food supply, ornamental gardens and forests possible.
- Algae and seaweed: unique organisms as a food source and raw material.
- Conversion of waste streams : The power of organisms.
- Insects: role of insects in decomposing organic matter and their potential as a source of food and feed.
- Fungi (including mushrooms): life cycle of fungi and application role in conversion of residual streams
- Earthworms: role of earthworms in soil structure, nutrient conversion and composting.
- Soil, nutrition and carbon.

- Terrestrial ecosystems in a key position within global element cycles: How do naturally occurring fluxes of carbon, nitrogen and phosphorus compare with human-generated ones? What is the specific role of (agro)ecosystems within those cycles?
- Soils and soil fertility: What are soils really? What factors determine a healthy and fertile soil?
- Nutrient management: Use of N and P for food production. Environmental aspects of nutrient use in agriculture.
- Agriculture, carbon and greenhouse gas emissions: role of plants and soil in carbon sequestration and impact of agricultural management on greenhouse gas emissions.

Initial competences

The course builds on certain final competencies of the following course units:

- Microbiology
- Organic chemistry
- Technology for the circular economy

Final competences

- 1 To be able to describe the structure and life cycle of plants, including the factors that influence growth, development and optimal conservation.
- 2 To understand that due to the diversity of different types of crops in agriculture, horticulture and forestry, there is a huge potential of residual streams available
- 3 To compare and critically approach the technical capabilities of helper organisms such as insects, fungi, earthworms in the decomposition and conversion of organic matter, including their potential to engage them and create valuable products.
- 4 Knowledge and understanding of the principles of soil fertility, nutrient cycling and carbon sequestration as a function of circularity of sustainable agricultural production.

Conditions for credit contract

Access to this course unit via a credit contract is unrestricted: the student takes into consideration the conditions mentioned in 'Starting Competences'

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Excursion, Lecture, Practical, Independent work, Peer teaching

Extra information on the teaching methods

The lectures provide a theoretical framework. This is further explored in an individual paper analyzing a specific case. Students present their findings through peer teaching. There are also field trips and practicals to put theory into practice.

Study material

Type: Syllabus

Name: Biological resources
 Indicative price: € 10
 Optional: no
 Language : Dutch
 Number of Pages : 120
 Oldest Usable Edition : 2024-2025
 Online Available : Yes
 Available in the Library : No
 Available through Student Association : No

References

Course content-related study coaching

The instructor is available for additional explanation after making an appointment.

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, Presentation, Assignment

Examination methods in case of periodic assessment during the second examination period

Written assessment with open-ended questions, Assignment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Calculation of the examination mark

theory: 12/20; microteaching: 2/20; paper: 3/20, report practicals and excursions:

3/20

The student must participate in all practicals, microteaching assignment, field trips and exams in order to pass and this both in terms of period-based and non-period-based evaluations. The assessment and establishment of the final grade is done through the mathematical average according to the assigned coefficients. When one does not participate in the evaluation of one or more components, or one achieves less than 8/20 (not completed) on one or more components, one can no longer pass the course unit. If the final score calculation would still be 10 (or more) out of 20,

this will be reduced to 9/20.