GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

End-of-life Strategies for Packaging (I690024)

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

Credits 3.0 **Study time 90 h**

Course offerings in academic year 2025-2026

A (Year)	English	Kortrijk

Lecturers in academic year 2025-2026

De Meester, Steven	LA24	lecturer-in-charge
Nachtergaele, Pieter	LA24	co-lecturer

Offered in the following programmes in 2025-2026	**crdts**	**offering**
Postgraduate Certificate Food Packaging	3	A
Postgraduate Certificate Sustainable Food Packaging Solutions	3	A

Teaching languages

English

Keywords

Management of end-of-life packaging, material flows, recycling, reuse, thermal energy recovery

Position of the course

The purpose of this course is to provide the students with theoretical insights into the wide range of physicochemical
techniques to process end-of-life food packaging. Therein, emphasis is made – in decreasing order of
importance – on reuse, materials reuse (recycling), energy recovery and disposal with respect to the aim of
solid waste and material management. The technical and organisational aspects of waste prevention,
transformation and disposal are dealt with from an environmental, legal, and economical angle. Special
attention is paid to specific material streams which constitute a challenge in society's transition
towards a circular economy. The course enables the students to address food packaging and material reuse issues that industry is facing today and will face tomorrow.

Contents

1. Introduction
· Material and waste flows, resource efficiency, linear versus circular economy
· Waste and recycling policies in the EU: key concepts
· Integrated waste management
· Solid waste logistics
2. Recycling and material reuse technology: physical unit processes
· Densification
· Size reduction techniques
· Sorting based on density, size, optical and IR properties, electromagnetic properties. Flotation and
dewatering.
3. Recycling and material reuse technology: specific key waste streams
· Plastic recycling: type of waste plastics, mechanical and thermal recycling, thermochemical recycling and

gasification, energy recovery and refuse derived fuel
· Paper/cardboard waste: types, energy and material recovery
· Others: waste oils and lipids, food waste
4. Thermal processing and energy recovery
· Relevant physicochemical properties of waste and materials for energy recovery (density, heating values, proximate composition, elemental composition)
· Incineration of non-hazardous and hazardous waste and required flue gas treatment
· Grate ovens for municipal solid waste, fluid bed combustion for RDF and sewage sludge
· Non-conventional thermal valorisation: gasification and pyrolysis
· Energy recovery: steam cycle, organic Rankine cycle, cycle efficiency, district heating networks
5. Landfilling
· Types of landfill
· Construction of a landfill and subsequent exploitation
· Collection of landfill gas and leachate; appropriate landfill gas valorisation and leachate treatment systems
· Clean-up of disused landfill site; material reuse by landfill mining

Initial competences

Basic knowledge of chemistry and physics; Final competencies obtained in the course unit 'Food
packaging materials, machines and conditions'.

Final competences

1 To have insights into material flows and the available techniques for collection, processing of end-of-life food packaging with an emphasis on maximum material reuse and/or energy recovery.
2 To formulate a proposal to prevent, reuse or dispose of a specific material or solid waste stream.
3 To qualitatively determine processes in packaging waste management.

Conditions for credit contract

This course unit cannot be taken via a credit contract

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, Independent work

Extra information on the teaching methods

Theory consists of lectures (can be online) (25 hrs).
Independent work (5 hrs)

Study material

Type: Slides

Name: Course slides
Indicative price: Free or paid by faculty
Optional: no
Available on Ufora : Yes

References

Course content-related study coaching

The lecturer is available during and after the lectures for questioning, feedback and guidance. Additionally,
the lecturer can be consulted electronically through e-mail, or personally upon making an appointment.

Assessment moments

end-of-term assessment

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

Assignment

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

Assignment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

Assignment: the evaluation of this course is part of an individual integrative assignment in which students have to integrate and apply knowledge and competences from all the different courses making up the specific elective track of the postgraduate certificate Food Packaging. The student (qualitatively) evaluates a food product-packaging concept. The product-packaging concept will be predetermined before the start of the lectures. The student should demonstrate s/he is able to apply the course in an interdisciplinary way, and explain the concept from a course specific perspective.
The product of the assignment is a report (including a self-reflection) which will be presented to a jury.
Students who eschew period aligned evaluations for this course unit may be failed by the examiner.

Calculation of the examination mark

The assignment:
- Report (40%)
- Presentation (20%)
- Q&A (40%)

Evaluation of the process: participation and collaboration in the team, communication inside and outside the organisation, commitment, initiative, quality of execution, problem approach