

Food Packaging Design (I690013)

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

Credits 5.0 **Study time 150 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 2)	English	Kortrijk	lecture independent work group work
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Lecturers in academic year 2024-2025

ten Klooster, Roland	LA23	lecturer-in-charge
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Offered in the following programmes in 2024-2025

	crdts	offering
Master of Science in Sustainable Food Packaging	5	A

Teaching languages

English

Keywords

Packaging design, multi-criteria-decision-making, packaging materials, metal, glass, paper and board, plastics, biobased and biodegradable materials, sustainability, packaging system, convenience, influence of appearance, intellectual property

Position of the course

This course focuses on the design of food packaging and problem solving approaches in packaging creation. The vulnerabilities of the product to be packed are used to determine the requirements that will lead to possibilities for a solution. The process of decision making is viewed from the perspective of all stakeholders, and stage gate models are introduced to go through the different steps in the process. Aspects like the influence of design on choice behaviour, convenience and sustainability are part of the design process. Finally, a student must be able to be a partner in the design process of food packaging with all the aspects involved.

Contents

Introduction into packaging design, the process, theories, stakeholders

Functions of packaging from a design (engineering) perspective

- Protecting the product
- Distributing the packed product
- Informing all users in the chain
- Selling the product

Design methodology – design thinking

- The method behind a design approach
 - o Analyses, defining a problem
 - o Syntheses, coming up with ideas
 - o Simulation, comparing the ideas and making choices
 - o Development of the chosen idea to a running packaging line
 - o Evaluation

Detailing the design process

- How to execute a proper analysis
- How to formulate requirements

- The difference between starting points, requirements, wishes
 - The stated purpose
 - The influence of a briefing
 - How practice works
 - Understanding the logic behind design (it is not possible to choose the best solution)
- Packaging materials – an overview of characteristics in making choices for a food packaging design.
- This part elaborates on earlier course units that pay attention to packaging materials like 'Food packaging systems: materials, machines and packaging conditions', and 'Food Safety of Packaging Materials'. The basic knowledge of materials is required to understand this part of the course.
- Common overview of characteristics related to barriers, strength, humidity behaviour etc.
 - Designing in paper and board – how to choose a material and define the technical specification
 - o Paper types: mechanical and chemical (sulphate and sulphite) based paper types, the use of recycled fibers
 - o Board types: corrugated, folding boxboard, solid board
 - o Lay-out drawings, folding patterns
 - o Design rules and using standards (FEFCO and ECMA)
 - o Perspective from viewpoint of sustainability
 - o Costs and key figures of packaging made from paper and board
 - Designing for metal packaging - how to choose a packaging/material/coating
 - o Steel
 - o Aluminium
 - o Design rules and using standardised designs
 - o The sustainability perspective
 - o Costs and key figures for metal packaging
 - Designing in glass - how to choose a design, specifics
 - o Different glass types used for packaging
 - o Blow-blow, press blow, tube forming and pressing
 - o Bottles, jars, syringes, etc.
 - o From design sketch to bottle shape and volume
 - o The sustainability perspective
 - o Costs and key figures for glass packaging
 - Designing in plastic - how to choose a material and technical specification
 - o From extruder to film, injection moulding, thermoforming, blow moulding
 - o Laminates
 - o Design rules for cups, trays, etc.
 - o The sustainability perspective
 - o Costs and key figures for plastic packaging
 - Using tools to compare packaging from sustainability point of view / the difficulty to compare solutions of different packaging materials
- Printing techniques and when to use which technique
- Offset, flexography, gravure, pad printing, screen printing, digital printing
- Packaging design – dealing with complexity of decision making
- Multi-criteria decision making and the role of information
 - Balanced weigh score cards processes
 - Different design methodologies and approaches
- Stage gate models
- Learning to prioritise the choices that have to be made
 - Splitting up the design in functional parts
- Sustainability in packaging design
- The role of packaging in the chain
 - Product-packaging approach, the packaging as serving entity for the product
 - The models that are used based on eco-design approaches, from marketing to packaging solutions
 - The use of sustainability claims on packaging
- Circularity – key players, and methods
- Ellen MacArthur Foundation
 - European circularity plans
 - Pack Forward

- ...
What is happening in the field

Initial competences

Competences obtained in the previous course units: Food packaging systems: materials, machines and packaging conditions; Food packaging economics & management; Shelf-life of packed foods; Sustainability in food systems; Food safety of packaging materials; End-of-life management of packaging; Quality management in food packaging.

Final competences

- 1 To have knowledge of and insights in methods, developments, trends etc. in the field of sustainable packaging design
- 2 To apply design processes and decision-making as a pro-active partner in sustainable packaging design
- 3 To generate ideas to make the product-packaging-combination more sustainable
- 4 To discuss with different stakeholders sustainable packaging concepts at strategic and tactical level
- 5 To act as a full partner in development teams for sustainable food packaging

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

Group work, Lecture, Independent work

Extra information on the teaching methods

Lectures: 18 hrs: divided across 6 weeks (some lectures, especially with theoretical background, can also be provided online)

Lectures: plenary exercises: 12 hrs: group exercises and some individual exercises related to the lectures.

Independent work: 7.5 hrs: some assignments will be presented as preparatory work for next time.

Final individual assignment will be worked out in steps (group work (to learn from each other): 8 hrs), guided by the teacher (guided self-study: 4,5 hrs)

Study material

Type: Handouts

Name: Powerpoint presentations

Indicative price: Free or paid by faculty

Optional: no

References

Chapters from book: Packaging Design Decisions, a technical guide (Destech publishment)

Packforward publication of the KIDV (free available pdf)

Sheets of lectures

Scientific articles taken up in lectures

Guides of industry

Tools for sustainable packaging design like recycle guides, PackForward approach, etc.

Course content-related study coaching

The teacher can be contacted by e-mail and by online meetings if needed. Before and after the lectures and

exercises, the student can also ask additional information to the teacher or assistant.

There will be feedback on assignments that are given to the student or to groups of students before the final assignment.

Assessment moments

continuous assessment

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

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

Examination methods in case of permanent assessment

Participation, Peer and/or self 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

Students work on an individual assignment. They have to develop a sustainable packaging, if possible related to the work/job/interest. Some parts will be done as group work like making overviews of functions and the description of the packaging process. Active participation is required. The students present their design in small groups and discuss the results. The group dynamics are evaluated by means of peer-assessment. They receive a form to write out their findings in a structured way. This also helps to make sure the students assess the delivered work from the necessary multiple perspectives.

Second chance exam: additional input can be asked related to the individual part of the assignment. If the role of the student in group assignments turned out to be poor, an oral re-exam is possible.

Calculation of the examination mark

Final assignment: 75%. The assignment is graded based on several parts. Used methodology 15%, functional specification/requirements/stated purpose/briefing 15%, use of material 25% including production process, packaging process 10%, substantiation of sustainability 20%, convenience and appearance (consumer related issue) 15%.

The assignments students make during the courses are not counted for the final mark but are meant as training for the final assignment.

Active participation and peer assessment (process): 25%: the students are evaluated on how they use the group moments to elaborate their work (way of presenting and discussing with peers) and how the peers experience their team skills by means of a peer-assessment.

Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.