GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2022-2023

Shelf Life of Packed Foods (I690008)

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

Credits 7.0 **Study time 210 h** **Contact hrs** 70.0h

Course offerings and teaching methods in academic year 2022-2023

A (semester 1)	English	Kortrijk	lecture	30.0h
			guided self-study	20.0h
			group work	10.0h
			lecture: plenary exercises	10.0h

Lecturers in academic year 2022-2023

Devlieghere, Frank	LA23	lecturer-in-charge
De Meulenaer, Bruno	LA23	co-lecturer

Offered in the following programmes in 2022-2023	**crdts**	**offering**
Master of Science in Sustainable Food Packaging	7	A

Teaching languages

English

Keywords

Food chemistry, food microbiology, food preservation, food spoilage, nutritional value, shelf life, packaging

Position of the course

In this course the various - microbiological, physiological, chemical and physical - phenomena leading to
deterioration of packed foods will be presented, with a special focus on the role of packaging. Topics include
basic aspects of food microbiology (microbiological aspects of food preservation with a special focus on how
packaging influences the microbial behaviour [spoilage micro-organisms as well as food pathogens]) and food
chemistry (the study of the chemical, biochemical and physicochemical processes involved in agricultural raw
materials and in foodstuffs, and during the transformation of agricultural raw materials into derived products).
Considering the main constituents of foods, a selection of chemical and physicochemical
properties will be discussed relevant for packed foods. Special attention is given to the kinetics of shelf life
determining factors. Students learn how to design shelf life studies, taking into account the factors determining
the quality and safety of foods.

Contents

1. Introduction: food quality and safety as determinants for shelf life of packed foods

Part 1: Chemical-physical aspects
2. Water as determinant for shelf life of packed foods
3. Lipids as key compounds causing rancidity
4. Proteins as receptors for reactive carbonyls impact quality of packed foods
5. Enzymatic reactions relevant for packed foods

6. Pivotal minor substances in packed foods: vitamins and pigments (and aroma compounds?)

Part 2: Microbiological and physiological aspects
7. Microbial spoilage of packaged food products
8. Microbial safety aspects determining the shelf life of packaged products
9. Intrinsic and extrinsic factors influencing the microbial shelf life of packed foods
10. Atmosphere as determinant for microbial and physiological shelf life of packed foods

Part 3: Shelf life determination
11. Chemical shelf life determination and modelling
12. Microbiological shelf life determination and modelling
13. Case studies

Initial competences

Basic general and organic chemistry, biochemistry, general microbiology, basic aspects of modelling.

Final competences

1 To identify the factors which determine the shelf life of foods.
2 To assess the parameters of the phenomena determining the shelf life of foods.
3 To assess the impact of the packaging system on the shelf life of foods.
4 To design, interpret and discuss in a multidisciplinary team shelf life studies.
5 To present a case study in a professional way and to discuss the obtained results in group.

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

Lecture: plenary exercises, Group work, Guided self-study, Lecture

Extra information on the teaching methods

Lectures: 30 hrs
Lectures: plenary exercises: 10 hrs: modelling of shelf life of packed food products.
Group work: 10 hrs: The students should elaborate two case studies in a group work covering products
with respectively a short and longer shelf life for which a shelf life determination protocol is designed. One
of these case studies will build on the group work carried out in the course Food Packaging
Systems: materials, equipment and packaging conditions. The case studies are presented and discussed.
Guided self-study: 20 hrs: In the framework of the case studies, the students should gather relevant
information enabling them to identify the key processes and parameters determining the shelf life of the
packed food.

Learning materials and price

Course notes and PowerPoint presentations

References

Modern Food Microbiology (J. Jay)
Food Chemistry (Belitz)
Fennema's Food Chemistry (S. Damodaran, K. L. Parkin)
Food packaging and shelf life. A practical Guide (G.L. Robertson)

Course content-related study coaching

Before and after the lectures and exercises, the student can ask the teacher or assistant for additional information

or explanation. The teacher and assistant can also be contacted by email.

Assessment moments

end-of-term and continuous assessment

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

Written examination, Oral examination

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

Written examination, Oral examination

Examination methods in case of permanent assessment

Oral examination, Peer 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 period related evaluation consists of a written examination with open questions and an oral examination, with open book preparation.
The case studies will be evaluated via non-period related evaluation for which an assignment should be submitted and a presentation should be given (oral examination). Group dynamics (team skills) are evaluated by means of a peer assessment

Calculation of the examination mark

Periodic evaluation: 60%:
- 50% written exam - closed book
- 50% oral exam: written preparation (open book) with oral defence

Non-periodic evaluation: 40%:
- Report + peer-assessment (50%)
- Oral presentation (25%) and defence (25%)

The student needs to participate in all assignments and exams that are part of the evaluation (period
aligned and non-period aligned). Students who eschew period aligned and/or non-period aligned
evaluations for this course unit, or when one obtains a score lower than 8/20 (not rounded up) on one of
both parts (period aligned or nonperiod aligned evaluation), they will fail for this course unit. In that case the
end score is set to 9/20 even when the calculation indicates a point of 10/20 or more.