

Formulation and Structuring of Foods (I002723)

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 1)	English	Gent	lecture
			group work
			independent work

Lecturers in academic year 2024-2025

Moens, Kim	LA23	staff member
Van Bockstaele, Filip	LA23	lecturer-in-charge
Dewettinck, Koen	LA23	co-lecturer

Offered in the following programmes in 2024-2025

	crdts	offering
Master of Science in Bioscience Engineering: Food Science and Nutrition	5	A
Master of Science in Food Technology	5	A
Exchange Programme in Bioscience Engineering: Food Science and Nutrition (master's level)	5	A

Teaching languages

English

Keywords

Foods, composition, formulation, (micro)structure, quality, stability, functionality, innovation, product development

Position of the course

This course deals with the (micro)structural formulation aspects of foods. The functionality of most important ingredients and additives and their interactions is discussed. The formulation, production and physicochemical properties of some important (micro)structures (gels, emulsions, fat crystal network,...) are considered in great detail. This is linked with the technological aspects of product innovation.

Contents

- Rheology and texture
- Advanced analytical techniques
- Water
- Thickening and gelling
- Dispersions: suspensions, emulsions and foams
- Fat crystallization and oleogelation

Initial competences

Formulation and structuring of foods builds on certain learning outcomes of the course unit food chemistry; or the learning outcomes are acquired in a different way.

Final competences

- 1 Identify the functionality of food ingredients and additives
- 2 Assess and select food ingredients and additives based on product specifications
- 3 Assess and select formulation techniques based on product specifications
- 4 Relate product formulation with the microstructure of foods
- 5 Analyze the effect of formulation and formulation techniques on food characteristics with the correct analytical techniques
- 6 Integrate theoretical concepts in practice

7 Collaborate in a team

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

This course is organized as a flipped classroom. The first lecture is a traditional lecture with an introduction to this course. During the following seven weeks, the students are offered a set of course materials with which they prepare the response lecture. They are asked to solve questions and implement their knowledge in case studies before the response lecture. This response lecture is not a regular lecture, but during this lecture the questions and case studies prepared by the students will be discussed in group and further elaborated. During the response lectures, also demonstrations in the laboratories will be included.

Besides, the students work on a research project. The aim is to set the research questions and hypotheses, design the experiments, execute experiments and report about the results.

Study material

Type: Slides

Name: Lectures

Indicative price: Free or paid by faculty

Optional: no

Language : English

Available on Ufora : Yes

Online Available : Yes

Type: Lab Material

Name: Food products for project

Indicative price: Free or paid by faculty

Optional: no

Additional information: During the project, students will need food products to analyse. Those costs are refunded.

References

Rheology: Mezger, T. G. (2014). The rheology handbook. Vincentz Network GmbH & Co. KG, Hanover, 434 p.

Advanced analytical techniques: Nielsen, S.S. (2017). Food Analysis. Springer International Publishing, 647 p.

Water: Hartel, R.W., von Elbe, J.H., Hofberger, R. (2018). Confectionery science and technology. Springer International Publishing, 542 p.

Thickening and gelling: Dickinson, E. (2005). Food colloids: interactions, microstructure and processing. The royal society of chemistry, Cambridge, 497 p.

Dispersions: suspensions, emulsions and foams:

• Sjoblom, J. (2001). Encyclopedic handbook of emulsion technology, Marcel Dekker, New York, 736 p.

• Norn, V. (2015). Emulsifiers in food technology, John Wiley & Sons, 369p.

Fat crystallization and oleogelation:

• Sato, K. (2018). Crystallization of lipids. Fundamentals and applications in food, cosmetics, and pharmaceuticals, Wiley Blackwell Publishing, 516 p.

• Marangoni, A.G. (2018). Structure-Function Analysis of Edible Fats. AOCS, 420p.

Course content-related study coaching

Students can discuss their questions and problems with the lecturers during the response lectures.

Assessment moments

end-of-term and continuous assessment

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

Oral assessment, Presentation

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

Oral assessment, Presentation

Examination methods in case of permanent assessment

Participation, Peer and/or self assessment

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

Periodic evaluation: the oral examination is a combination of

- Group presentation of the research project + questioning by the lecturers
- Individual examination about the theory with written preparation

Permanent evaluation includes participation (preparation of the response lectures, presence and commitment during project meetings, quality of meeting reports, commitment during intermediate presentations) and peer-assessment

Calculation of the examination mark

The theory is assessed as participation and oral examination and counts for 50% of the final mark.

The project is assessed as peer-assessment, participation and oral examination and counts for 50% of the final mark.

Students who escew periodic and/or permanent evaluations cannot pass the exam. If the final mark is still 10/20 (or higher), the mark is reduced to 9/20. The responsible lecturer remains responsible for the final grade.

Students who have less than 10/20 for at least one of the evaluation parts (theory or project) cannot pass for this course. If the final mark is still 10/20 (or higher), the mark is reduced to 9/20.