

Food Chemistry and Analysis (I002757)

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

Credits 7.0

Study time 210 h

Course offerings and teaching methods in academic year 2023-2024

A (semester 1)

English

Gent

lecture

practical

Lecturers in academic year 2023-2024

De Meulenaer, Bruno

LA23

lecturer-in-charge

Offered in the following programmes in 2023-2024

crdts

offering

[Master of Science in Food Technology](#)

7

A

[Exchange Programme in Bioscience Engineering: Chemistry and Bioprocess Technology \(master's level\)](#)

7

A

[Exchange Programme in Bioscience Engineering: Food Science and Nutrition \(master's level\)](#)

7

A

Teaching languages

English

Keywords

Food, agricultural raw materials, chemical composition, properties, degradation reactions, nutritional value, food safety

Position of the course

Food chemistry deals with 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.

A systematic overview of the main constituents of foods is given together with a selection of their chemical and physicochemical properties. Considering the diversity in the background of the attending student population, especially with respect to their chemical background, special attention is given to familiarise the students with the basic structures of food constituents. In addition, the examples given in the course consider as much as possible the international context of the attending student population.

Contents

Theoretical course:

- 1 Introduction
- 2 Water
- 3 Proteins
- 4 Lipids
- 5 Carbohydrates
- 6 Enzymes
- 7 Vitamins
- 8 Additives

Practical course:

- 1 Theoretical introduction to chemical food analysis
 - 1.1. Stoichiometry
 - 1.2. Introduction to chromatography

- 1.3. Determination of moisture and ash content
- 1.4. Protein analysis and characterisation
- 1.5. Lipid analysis and characterisation
- 1.6. Carbohydrate analysis
- 1.7. Vitamin analysis
2. Practical laboratory exercises

In the practical laboratory exercises, the students need to determine both nutritionally and quality relevant chemical parameters in foods. In view of the diversity of chemical background of the students, also with respect to their practical background in analytical chemistry, also a training is foreseen in practical basic analytical principles.

Initial competences

Having acquired all learning outcomes of the following courses or their equivalents:

- Chemistry 1: Structure of Matter (I001826)
- Chemistry 2: Reactivity of Matter (I001831)
- Chemistry 3: Organic Chemistry - structure (I001839)
- Chemistry 4: Organic Chemistry - reactivity (I001846)
- Biochemistry and Molecular Biology (I001838)

Final competences

- 1 Describe selected chemical characteristics of agricultural raw materials and their derived products
- 2 Identify and describe the chemical process which determine the quality of agricultural raw materials and their derived products
- 3 To identify on basis of a vertical thinking process the chemical parameters determining the quality of agricultural raw materials and their derived products and to assess these parameters.
- 4 Substantiate the steps in the analysis of chemical quality parameters of agricultural raw materials and their derived products
- 5 Apply analytical protocols for chemical quality parameters of agricultural raw materials and their derived products
- 6 To communicate scientifically with respect to the chemical characteristics of agricultural raw materials and their derived products

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, Practical

Extra information on the teaching methods

The lectures fit in to both the theoretical lectures and the theoretical introduction to the practicals. With respect to the theoretical lectures, the chapters mentioned earlier are discussed. In the framework of the analytical part of the course, lectures are given with respect to the analytical approaches used in chemical food analysis, according to the table of content given earlier.

The analytical part of the course is further complemented with practicals in the laboratory in which the student is familiarized with basic analytical chemical techniques, analytical techniques to assess quantitative information on compositional and quality parameters of foods.

Learning materials and price

Course notes of both the theoretical and practical lectures are available to the student in order to copy them.

Apart from that the course notes are supplemented with the presentations which are given during the lectures and which are electronically available for the students.

References

- Fennema, O. et al. (Eds) 2007) Fennema's Food Chemistry, Marcel Dekker, New, York, ISBN 0849392721
- Belitz, H.-D., Grosch, W., Schieberle, P. (2009) Food Chemistry, Springer, Berlin, ISBN 978-3-540-69934-7

(Approved)

Course content-related study coaching

Study coaching is accomplished via

- theoretical lectures
- practical lab exercises
- at the end of each lectures, student will have the opportunity to ask for 15 min questions to the teacher
- the possibility to consult the teacher or his collaborators after the theoretical lectures or exercises, on appointment
- availability in the library of reference books and specialised journals
- availability in the library of other specialized literature, databases and other relevant materials

Assessment moments

end-of-term and continuous assessment

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

Oral assessment, Written assessment

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

Oral assessment, Written assessment

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

From the period aligned evaluations, a clear idea can be obtained from the students analytical and synthetic skills. These should allow the student to identify problems related to the subject area and propose potential solutions for them, on basis of causality.

From the non-period aligned evaluation during the exercises the other skills as mentioned in the Final Objectives are evaluated. In addition, the creative and communicative attitudes of the students can be assessed. Finally, the students are stimulated to work in group together.

The theory is assessed by a written examination with open questions (33% total marks) and an oral examination with open question (33% total marks).

The analytical part of the course (33% total marks) is assessed via a periodic assessment via a report submitted by the students (10% of the marks of the practicals) and via a closed book examination with open questions with respect to the lectures on chemical analysis and via an open book examination with open questions with respect to the practicals (90 % of the marks of the practicals).

All these examinations will allow to evaluate the students thorough and fundamental knowledge and the students analytical and critical skills developed in this particular discipline. Considering the exercises, especially the ability to handle and interpret analysis results will be evaluated in addition to the critical understanding of the underlying chemical principles of an analytical method. During the oral examinations, the communicative skills of the student can be assessed.

Calculation of the examination mark

The non-period aligned evaluation of the exercises is sometimes used to upgrade the scores on the oral examination of the theory in case of a calamity.

Students who do not take part in the practicals cannot obtain credits for this course.

Students who eschew periodic and/or permanent evaluations for this course cannot obtain credits for this course.