

Food Technology (0000104)

Due to Covid 19, the education and assessment methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size *(nominal values; actual values may depend on programme)*
Credits 5.0 **Study time 150 h** **Contact hrs** 60.0h

Course offerings and teaching methods in academic year 2021-2022

| Offering | Language | Mode | Teaching Method | Hours |
|----------------|----------|---------|----------------------------|-------|
| A (semester 1) | English | Incheon | project | 10.0h |
| | | | seminar: coached exercises | 5.0h |
| | | | lecture | 20.0h |
| | | | practicum | 25.0h |

Lecturers in academic year 2021-2022

| | | |
|----------------|------|--------------------|
| Van Haute, Sam | KR01 | lecturer-in-charge |
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Offered in the following programmes in 2021-2022

| Programme | credits | offering |
|--|---------|----------|
| Bachelor of Science in Food Technology | 5 | A |

Teaching languages

English

Keywords

Food, Technology, Unit operations, Processing, Quality, Safety, Shelf life, Sensorial properties, Nutritional value, Packaging

Position of the course

The most important unit operations applied in the food industry are discussed. In particular attention is paid to the influence of applied unit operations on food quality in a wide sense.

Contents

1. Processes based on heat transfer
 - 1.1. Introduction
 - 1.2. Heat production
 - 1.3. Heat transfer in food processing
 - 1.4. Influence of heat on foodstuff
 - 1.5. Blanching
 - 1.6. Pasteurization
 - 1.7. Sterilization/UHT
 - 1.8. Cooling
 - 1.9. Freezing

2. Processes based on heat and mass transfer
 - 2.1. Evaporation
 - 2.2. Drying
 - 2.3. Frying
 - 2.4. Baking
 - 2.5. Extrusion
 - 2.6. Agglomeration

3. Processes based on mechanical separation
 - 3.1. Centrifugation
 - 3.2. Filtration
 - 3.3. Membrane separation

4. Processes based on electromagnetic radiation

- 4.1. Microwave and dielectric heating
- 4.2. Infrared heating
- 4.3. Irradiation

- 5. Food packaging
 - 5.1. Function of packaging: introduction
 - 5.2. Types of Packaging
 - 5.3. Packaging systems
 - 5.4. Modified atmosphere packaging
 - 5.5. Active and intelligent packaging
 - 5.6. Safety aspects of packaging migration

- 6. Nonthermal processing
 - 6.1. Concept of nonthermal processing
 - 6.2. Electromagnetic processes
 - 6.2.1. Pulsed electric field
 - 6.2.2. Oscillating magnetic fields
 - 6.2.3. UV light
 - 6.2.4. Pulsed light and pulsed UV
 - 6.2.5. Irradiation
 - 6.2.3. Cold plasma
 - 6.3. Physical processes
 - 6.3.1. High pressure processing
 - 6.3.2. Ultrasound
 - 6.4. Chemical oxidants
 - 6.4.1. liquid treatment
 - 6.4.2. gaseous treatment

Initial competences

Have taken Inorganic Chemistry I and II, Modern Aspects of Food (Introduction of Food Science), Organic Chemistry I and II

Final competences

- 1 Recall the properties of food raw materials and describe, select and apply different preparation techniques for raw materials prior to processing
- 2 Explain the principles of various unit operations including thermal processing, freezing, dehydration, aseptic processing, high pressure processing, microwave heating, irradiation... etc.
- 3 Perform calculations on heat inactivation of food associated microorganisms
- 4 Explain principles of fluid flow and rheology and their applications
- 5 Be aware of the impact of these unit operations on the quality of food products in a wide sense
- 6 Understand alternatives to heat treatments in order to guard the microbial food safety and quality of food products
- 7 Communicate on the state-of-the-art of a food technology topic through paper writing and presentation

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

Practicum, Lecture, Project, Seminar: coached exercises

Extra information on the teaching methods

Theory lectures, lab practicals. exercises, project: paper + presentation
 Exercises on heat inactivation of food associated microorganisms
 Lab practicals: the student learns to use several unit operations
 Project: the student studies in detail a selected food technology and describes in a small paper the state of the art of said technology. Subsequently the student communicates the findings through oral presentation

Learning materials and price

Learning materials in English

References

- HELDMAN D.R. & LUND D.B. (2007). Handbook of food engineering (second edition), Boca Raton, CRC Press, 1023p.
- PASSOS, M.L., RIBEIRO, C.P. (2010). Innovation in Food Engineering. New techniques and products. CRC Press, 721p. ISBN 978-1-4200-8606-5
- SINGH, R.P. & HELDMAN, D.R. (2001). Introduction to food engineering. San Diego, Academic Press Inc., 499 p. ISBN 0-12-646384-0
- VALENTAS, K.J., ROTSTEIN, E. & SINGH, R.P. (1997). Handbook of Food Engineering Practice. Boca Raton, CRC Press, 718 p. ISBN 0-8493-8694-2
- AHAVENAINEN, R. (2003). Novel Food Packaging Technologies. Woodhead Publishing Limited, Cambridge, ISBN 1-85573-675-6
- Air Products. A fresh approach to modified atmosphere packaging (MAP).
- BOSSET, J.O., GALLMAN, P.U., SIEBER, R. (1994) Influence of light transmittance of packaging materials on the shelf-life of milk and dairy products - a review. In: Mathlouthi, M. Food Packaging and preservation. Blackie Academic & Professional, London. ISBN 0-7514-0182-X
- COLES, R., McDOWELL, D., KIRWAN, M.J. (2003). Food Packaging Technology, Blackwell Publishing, Oxford. ISBN 1-84127-220-5.
- KERRY, J.P., O'GRADY, M.N., HOGAN, S.A. (2006). Past, current and potential utilisation of active and intelligent packaging systems for meat and muscle-based products: a review. Meat Science 74, 113-130.
- OZDEMIR, M. & FLOROS, J.D. (2004). Active Food Packaging Technologies. Critical Review in Food Science and Nutrition, 44, 185-193.
- Packaging Europe, 2007. Volume 2.2, 2.3 and 2.5.
- ROBERTSON, G.L. (2006). Food Packaging. Principles and Practice. Second Edition. Taylor & Francis, Boca Raton. ISBN 0-8493-3775-5
- Soft Drinks International. May 2007.
- VICKERS, F.G. & MEDLING, J. (2005). Filling equipment. In Senior, D. & DEGE, N. Technology of bottled water. Blackwell Publishing, Oxford, ISBN 1-4051-2038-X

Course content-related study coaching

Interactive counselling through Minerva, Electronic appointment booking, weekly office hours

Assessment moments

end-of-term and continuous assessment

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

Oral examination, Written examination with open questions

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

Oral examination, Written examination with open questions

Examination methods in case of permanent assessment

Report, Participation, Job performance 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

Midterm: multiple choice plus open questions, written only

Final exam: multiple choice plus open questions, written + oral explanation

Calculation of the examination mark

Midterm: 10 %

project: paper + presentation: 20 %

practicum: participation + report+ quiz: 20%

Final exam: written + oral: 50%