GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2019-2020

Food Technology (O000104)

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

Credits 5.0	Study time 150 h	Contact hrs	60.0 h

Course offerings and teaching methods in academic year 2019-2020

A (semester 1)	English	seminar: coached exercises	10.0 h
		lecture	25.0 h
		practicum	25.0 h

Lecturers in academic year 2019-2020

Van Haute, Sam	KR01	lecturer-in-charge

Offered in the following programmes in 2019-2020	crdts	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. Applications of steady-state heat transfer
1.5. Unsteady-state heat transfer
1.6. Influence of heat on foodstuff
1.7. Blanching
1.8. Pasteurization
1.9. Sterilization
1.10. UHT
1.11. Cooling
1.12. 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

Initial competences

Basic knowledge in food chemistry.

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 unit operations (heat transfer, mass balance, energy balance, design of unit operations)
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 Identify various food packaging materials (plastic, glass, metal, paper and paperboard) and describe their fabrication
7 Describe the concept of package/product compatibility and measures to minimize migrants from packaging materials into foods

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, practicum, seminar: coached exercises

Extra information on the teaching methods

Case studies, virtual experiments, Lab. practicals

Learning materials and price

Learning materials in English

References

HELDMAN D.R. & LUND D.B. (2007). Handbook of food engineering (secondedition), 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
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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

Evaluation methods

end-of-term evaluation and continuous assessment

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

Written examination with open questions

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

Written examination with open questions

Examination methods in case of permanent evaluation

Participation, job performance assessment, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Extra information on the examination methods

Quizes : Two case studies on a specific unit operation (heat transfer, design...etc)
Final exam : open questions

Calculation of the examination mark

Written examination with open questions - 50%
Participation - 10%
Report - 20%
Performance assesment - 20%