MSE-497

Introduction to food science and technology

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Cursus	Sem.	Type
Managmt, dur et tech	MA3	Opt.
Materials Science and Engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Oral
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

We consider food as a material at molecular & micro-structure levels, in relation to nutritional and organoleptic properties. We will learn about food process engineering principles applied to create taste and texture. We explore aspects of environmental sustainability, economy and public health.

Content

Keywords

Food process engineering; proteins, carbohydrates, lipids, vitamins, minerals, emulsions, foams, extrusion, spray-drying, homogenization

Learning Outcomes

By the end of the course, the student must be able to:

- Explain major challenges to the global system of food supply and demand including its economic and environmental implications.
- Describe the relationship between cost of a diet, industrial processing and cost of raw materials
- Discuss major food processing methodologies and their function for food manufacturing: organoleptic, safety, nutrition
- Explore the molecular composition, notably the nutritious compounds of food
- Analyze the role of water in foods
- Investigate micro-structural characteristics of major food groups such as emulsions, solid and liquid foams, crystalline structures
- Assess / Evaluate micro-structure forming mechanisms at the molecular level
- Assess / Evaluate the role of major food processing operations for creation of micro-structure in food
- Elaborate on the central chemical reaction pathways underlying taste and aroma formation in food processing

Transversal skills

- Demonstrate the capacity for critical thinking
- Take account of the social and human dimensions of the engineering profession.
- Communicate effectively with professionals from other disciplines.

Teaching methods

Lectures and a desk study. Upon interest an excursion to Nestlé Research, Lausanne, can be offered.

Expected student activities

A desk study on current scientific literature needs to be done related to societal, environmental and economic aspects of food manufacturing. A report on this study needs to be provided (<2000 words).

Assessment methods

30% on written report on desk study
70% on oral exam during the exam session

Resources

Bibliography

Food Process Engineering and Technology
Author: Zeki Berk
ISBN: 978-0-12-415923-5

Ressources en bibliothèque

- Find the references at the Library

Notes/Handbook

Course script will be provided.

Moodle Link

- https://go.epfl.ch/MSE-497