Summary
The course will deliver basic knowledge on the principles of food processing and chemical changes occurring during food manufacturing. Specific thermal processes related to transformation of food raw materials will be described along with benefits and challenges to consider.

Content

- Major chemical reactions taking place in food processing (Maillard reaction, lipid oxidation, interactions with polyphenols)
- Physico-chemical changes influencing product quality (aroma, taste, colour, texture, nutritional value)
- The role of water in food processing & preservation (water activity, shelf-life)
- Selected processes used in food preparation & manufacturing, such as
  - Thermal processes & inactivation
  - Drying & water reduction
  - Extrusion
  - Separation processes
  - Dispersed systems

Keywords
food chemistry, food processing, food technology, consumer benefits

Learning Prerequisites

Required courses
Basic chemistry, food chemistry

Recommended courses
It is recommended to also follow "Food Biotechnology" by Carl Erik Hansen, since the following 2 courses will alternate every second week on Friday afternoons: "Food Biotechnology" by Carl Erik Hansen and "Chemistry of food processes" by Imre Blank.
It is also recommended to attend the course "Food chemistry" given by Bernhard Klein in French.

Important concepts to start the course
Combine knowledge related to chemistry, biochemistry and food technology. Interest to learn how chemistry and food processing is applied in food manufacturing to produce safe products with added benefits.

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

- Describe basic principles of food processing
- Describe selected industrial food processes
- Understand chemical changes during food processing
- Understand factors governing food stability
- Describe classical drying processes in food technology
- Describe selected classical preservation methods
- Describe how thermal processes can deliver consumer benefits
- Describe basic safety aspects in food manufacturing

Teaching methods
Lecture, short exercises, group or individual presentation on a specific topic.

Expected student activities
Attend lectures. Each student will give a 15 minutes presentation during the semester. This presentation will be given alone or as a team, depending on the number of students. A potential visit to a Nestlé research facility will be decided during the semester.

Assessment methods
Written exam.

Supervision
Office hours: No
Assistants: No
Forum: No
Others: Q&A during the lectures. Short exercises during the lectures.

Resources
Bibliography

Ressources en bibliothèque
- Food Processing Technology / Fellows
- Food Chemistry / Belitz
- Food Processing Handbook / Brennan

Notes/Handbook
Electronic PDF Files to be downloaded from the EPFL site.

Websites
- http://scgc.epfl.ch/telechargement_cours_chimie