

## **FOOD 2002 Food Processing Credits: 0.5**

**Instructor:** Farah Hosseinian

**Contact:** [farah.hosseinian@carleton.ca](mailto:farah.hosseinian@carleton.ca)

**Office:** room 318 SC  
520-2600 ext 2048

Pre-requisites: FOOD 1001 & must be FSN student to enroll

Office hours: appointment by sending email

**Description:** The principles of the major techniques used in food processing and preservation are covered. The processing of specific food groups including fruits & vegetable, cereals, oilseeds, dairy, meat, beverages, chocolate, and frozen foods is covered. Product Developments and R&D role in food industry and food system is discussed.

**Learning Outcomes:** by the end of the course, the student should:

1. Understand and recognize the principles of food preservation.
2. Distinguish the principles of thermal and non-thermal food processing techniques.
3. Apply principles of food processing to commodities to achieve preservation.
4. Know the effects of processing factors on physical and chemical characteristics of foods.
5. Assess the effect of various physical processes in food processing on the chemistry of various food components, particularly high molecular weight components such as starch and proteins.
6. Identify and evaluate the principles of advanced food technologies to make a food product safe for consumption.
7. Remember food fundamentals and quality.
8. Create and organize critical thinking skills to solve issues arising from new situations, especially new processes.
9. Create and establish effective oral and written communication skills to solve issues in the food industry.

### **RECOMMENDED BOOKS (NOT MANDATORY):**

1. Food Processing, Principles and Applications. Edited by J. Scott Smith and Y. H. Hui. Blackwell Publishing Ltd (2004).
2. Potter, N.N., and Hotchkiss, J.H. 1998. Food Science. 5nd Edition. Avi Publishing Co. (1998).

## COMMUNICATING OUTSIDE OF CLASS:

I am generally prompt to reply by email. If you would like to come see me in person, I do not have office hours so it would be best to email me first to schedule a time to come see me at my office. Make sure to check for updates on CU-Learn on a weekly basis as I may post/update lectures as late as the evening before or at times the morning of the coming lecture. In addition, CU-learn is the best way for students to communicate with one another outside of class and there are news forums in which students can post questions, initiate group discussions and share ideas.

## SCHEDULE

Lectures are on Wednesdays & Fridays, 8:35 am-9:55 pm. Loeb Building B243

## COURSE EVALUATIONS

Mid-term test	35% (TBA; Oct. 2017)
Tow Quizzes	20%
Attendance	0.0%
Final Exam	45% (TBA; Dec. 2017)

(Covers all lecture material)

## SPECIAL ARRANGEMENTS

### **Pregnancy obligation –**

Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website

[http://www.carleton.ca/equity/accommodation/student\\_guide.htm](http://www.carleton.ca/equity/accommodation/student_guide.htm)

### **Religious obligation –**

Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website

[http://www.carleton.ca/equity/accommodation/student\\_guide.htm](http://www.carleton.ca/equity/accommodation/student_guide.htm)

### **Students with disabilities requiring academic accommodations -**

Students must register with the Paul Menton Centre for Students with Disabilities (PMC) for a formal evaluation of disability-related needs. Documented disabilities could include but are not limited to mobility/physical impairments, specific Learning Disabilities (LD), psychiatric/psychological disabilities, sensory disabilities, Attention Deficit Hyperactivity Disorder (ADHD), and chronic medical conditions. Registered PMC students are required to contact the PMC, 613-520-6608, every term to ensure that I receive your Letter of Accommodation, no later than two weeks before the first assignment is due or the first in-class test/midterm requiring accommodations. If you only require accommodations for your formally.

## **Policy on Plagiarism and Cheating (University Calendar)**

**The following topics will be covered during the course:**

Lec 1:

Introduction to thermal and non-thermal food processing techniques (LO: 1,2,4,6,7)

1. Basic processing theory.
2. Effect of heating or cooling processing techniques such as pasteurization, sterilization, evaporation, drying and freezing on quality of foods.
3. Effect of non-heat processing techniques such as air classification, extrusion, size reduction and filtration on quality of foods.
4. The effects of processing on physical and rheological characteristics of foods.
5. The effects of processing on chemical and nutritional characteristics of foods.
6. The effects of processing on sensory characteristics of foods.

Lec 2:

Processing of fruits & vegetable (LO: 1,2,4,6,7)

1. Composition of fruits and vegetables
2. Quality during processing
3. juicing
4. drying
5. freezing, canning
6. and jelly manufacture

Lec 3:

Processing of cereals (LO: 1,2,4,6,7)

1. Classification of cereals
  - a. wheat, barley, rye, triticale and other cereals including small cereals (e.g. amaranth)
2. Milling technology of wheat flour for bread production:
  - a. cleaning
  - b. air-classification
  - c. tempering
  - d. grinding
  - e. fortification...etc
3. Pasta production:
  - a. semolina processing

- b. important characteristics

Lec 4: (LO: 1,2,3,4,5,7)

Important factors for quality of bread processing

- a. starch types and properties
- b. effect of processing on starch gelatinization
- c. interaction of starch and other food components
- d. degradation of starch
- e. bubbles distributions

Lec 5: (LO: 1,2,3,4,5,7)

Processing of oilseeds (Part 1):

1. Crude vegetable oil production
  - a. mechanical extraction
  - b. solvent extraction
    - batch and continues methods
    - percolation
    - immersion
    - miscella distillation
    - meal production
2. Refining of crude oil/processing of RBD oil
  - a. degumming (by water and acid)
  - b. bleaching
  - c. deodorization
3. winterization
  - a. removing waxes and other high melting point substances
4. By-product utilization
  - a. meal production and applications
  - b. lecithin and gum production and applications
  - c. soap stock production and applications

Lec 6: (LO: 1,2,3,4,5,7)

Processing of margarine and shortening from oilseeds (Part 2):

1. Margarine production
  - a. basestocks processing

- b. hydrogenation
  - c. solidification
  - d. interesterification
  - e. crystal behaviour
2. Production of shortening/bakery fat for pastry purposes
- a. basestocks processing
  - b. hydrogenation
  - c. solidification
  - d. crystal behaviour

Lec 7: (LO: 1,2,3,4,5,7)

Processing of milk and dairy products (Part 1)

1. Milk processing
  - a. composition and structure
  - b. processing and effects on sensory and nutritional qualities
  
2. Cheese and whey
  - a. composition and chemistry
  - b. production
  - c. type of cheese and quality
  - d. type of whey and quality
  - e. utilization of whey/by-product
  
3. Butter and butter milk
  - a. composition and chemistry
  - b. type of butter and quality
  - c. type of butter milk and quality
  - d. utilization of butter milk/by-product

Lec 8: (LO: 1,2,3,4,5,7)

Processing of milk and dairy products (Part 2)

4. Yogurt & Kefir
  - a. composition and chemistry
  - b. type of yogurt & kefir
  - c. processing and physical and rheology and properties
  
5. Ice-cream
  - a. composition and chemistry

- b. freezing process
- c. nucleation phenomenon
- d. importance of crystallization rate
- e. role of stabilizer on crystal size
- f. calculate over run ice cream

Lec 9: (1,2,3,4,5,6)

#### Product Development & Sensory Evaluation

- 1. Understand the concepts of the new product
- 2. Consumer panel testing
- 3. Development of prototypes

Lec 10: (LO: 6,7,8,9)

R & D and solve issues arising from new situations in food industry to create new product development

- 1. R&D role in food industry and food system
  - a. Importance of R&D
  - b. Government involvement in food industry R&D
  - c. R&D Fundamental to marketing
  - d. Consumer role in product development
  - e. R&D and entrepreneurship
  - f. leadership and management capability
  - g. Improving competitiveness
  - h. Delivering skills
  - i. Supporting Research & Innovation

Lec 11 : (LO: 6,7,8,9)

R & D and solve issues arising from new situations to improve sustainability of food industry

- 1. Identify, assess and solve the problem
  - a. establish critical thinking skills
  - b. create and establish effective oral and written communication skills
  - c. remember food fundamentals and quality
  - d. organize principles of advanced food technologies to make a food product safe for consumption.
  - e. create and establish effective oral and written communication skills to solve the problem
  - f. deliver the leadership skills