Code: 1739 **Food Processing and Preservation**
Degree: 1st cycle – Food Science and Engineering
Curricular Year: 3rd **Semester Course: 1st**
Credits: 6 ECTS **Compulsory**
Language: Portuguese/English
Responsible: Margarida Gomes Moldão Martins
Other lecturer(s): -
Web site: http://www.isa.utl.pt/home/node/4033

1. Contact hours:
Lecture/Practicals 56 **Praticals/Laboratory** 14 **Others** 14 **Total** 84

2. Objectives:

- To review the degradation/preservation mechanisms;
- To understand the concept of conventional food processing/preservation mechanisms and industrial applications;
- To understand modification, improvement and utilization of raw materials in the food area.
- Case-study applications.

3. Programme:

Presentation of: Program, the evaluation of the knowledge methodology and bibliography.
Introduction. The food industry today. Processing and food quality.
Ambient-temperature processing/preservation: Raw material preparation, size reduction, mixing and forming, separation and concentration of food components, food additives, antioxidants and preservatives on food stability, smoked foods.
Water activity and food preservation: aw *vs* physical, chemical, and biological properties of foods and preservation ability. Processing by aw reduction: dehydration, freeze drying, concentration, freeze concentration, salt and sugar addition.
Processing by the removal of heat. Prediction of: thermal properties of the foods, final product temperature and chilling or freezing time. The main effect of freezing on food quality is damage caused to cells by ice crystal growth. Effects of frozen storage. Chilling, controlled- or modified-atmosphere, freezing; Vapour-compression systems. Equipment.
Processing by application of heat. The importance of thermal processing. Thermal processing and food safety, nutritional quality and sensorial attributes (colour, flavour and texture). Heat processing using steam, water or hot air. Blanching, Pasteurisation, Sterilisation, Dehydration. Equipment.
Hurdle technology

4. Bibliography:

Main Bibliography

- Cleland, A. C. and Cleland D.J. (1994). Cost-Effectve refrigeration. Massey University. New Zeland.
- Fellows P. (2000). *Food Processing and Technology. Principles and practice*. Woodhead Publishing Limited, Cambridge CB1 6AH, England.
- Scott Smith J. and Hui Y.H. (2004) Food Processing: Principles and Applications, Wiley-Blackwell.

Other Bibliography

- Perry, J.H. (1973). *Chemical Engineering Handbook,* 5 Ed, McCrow-Hill, New York.
- Helman, D.R. e Lund, D.B. (ed.) (1992). *Handbook of Food engineering*. Marcel Dekker, New York
- Sing, R.P. e Heldman, D.R. (1993), *Introduction to Food Engineering*, 2 Ed, Academic Press
- Spiess, W.E.L. e Schubert, H (1990). *Engineering and Food, Vol.2 Preservation process and related techniques.* Elsevier, Applied Science Pub, New York.
- Richardson F. (2001). Thermal technologies in food processing. Woodhead Publishing Lim., Cambridge CB1 6AH, England.

5. Assessment:

Compulsory: to attend 75% of Lecture/Practical and to perform 2 works;
Continuous evaluation: 2 tests (80% of final mark; average mark of the 2 tests must be equal or higher than 9.5; each test mark must not be lower than 8.0); lab reports (20% of final mark; minimum mark 9.5).
Exam Evaluation: Exam (minimum mark 9.5; 80% of final mark) and lab reports (minimum= 9.5; 20%

of final mark).

6. Estimated Workload:	168	Hours
7. Last Update:	12/7/2010	