

Code: 1477 **New Processes and Environmental Management**

Degree: 2nd cycle – Food Science and Engineering

Curricular Year: 1st

Semester Course: 2nd

Credits: 6 ECTS

Compulsory

Language: Portuguese/English

Responsible: Margarida Gomes Moldão Martins

Other lecturer(s): Elizabeth da Costa Neves Fernandes d'Almeida Duarte

Web Site: <http://www.isa.utl.pt/home/node/3838>

1. Contact hours:

Lectures 28 Lecture/Practicals 42 Others 14 Total 84

2. Objectives:

- To understand the news concepts of food processing/preservation mechanisms and industrial applications;
- To understand modification, improvement and utilization of emergent processes in the food area.
- To provide collective knowledge and experience for water reuse in industrial facilities.
- The students should be able to search and give solutions for the industrial sectors, for following topics: higher product yields, beneficial uses of byproducts, improved energy efficiency, safer and more reliable plant operations, improve public image, efficient water use and reduce environmental impacts.
- Case-study applications.

3. Programme:

New process in food production. *Non thermal processes:* High hydrostatic pressure, Ultra-sound, Mano-thermo-sonication, Irradiation, Pulsed electric fields, light pulses; *New thermal technologies:* radio frequency heating, microwave processing, infrared heating, Ohmic heating, combined high pressure thermal treatment of foods. New concepts of food packaging: active and intelligent packaging.

Environmental Management: Efficient Water Use in the Food Industry. Industry Water Life Cycle assessment. Plan implementation for the Efficient Water Use. Appropriate legislation/technical regulations and standards to implement water efficient technologies to overcome the eventual barriers in application of adequate measures. Best Available Technologies (BAT) for the treatment/valorization of water/wastewater and residues in Food Industry. Key parameters for the efficiency evaluation of the water/wastewater and residues treatment technologies.

Project: working in group to solve specific situations to apply the acquired knowledge.

4. Bibliography:

Main Bibliography

- Barbosa-Cánovas, et al (1998). Nonthermal preservation of foods, Marcel Dekker, Inc, New York
- Byer W, et al (1995). *How to Implement Industrial Water Reuse. A Systematic Approach.* AICE, Center for Waste Reduction Tech
- MAOTDR (2007). *Estratégia nac. para os efluentes agro-pecuários e agro-industriais – ENEAPAI.* ENEAPAI, Lx
- Da-Wen Sun (2005) Emerging Tech. for Food Proces, Food Science and Tech, Int series
- Richardson P. (2001), *Thermal tech in food proces*, CRC Press, Cambridge England
- Willing J. (1995). *Auditing for environmental quality leadership.* J W & Sons, USA.

Other Bibliography

- Duarte, E, Pinho, M N, Minhalma, M (2007). The Role of Emergent Tech Towards an Integrated Sustainable Environment. In *A Portrait of State-of-the-Art Research at the Technical University of Lisbon.* Ed. Springer, Manuel Seabra Pereira – IST, Lisbon. Pp. 401-420.
- Duarte, E A, Neto, I (2001). "Uso Eficiente da água, Casos exemplares e de demonstração do uso eficiente da água na indústria", Vol.3, Ed. LNEC, 123pp.
- Fellows P (2000). Food Proces & Tech. Principles & practice. CRC Press.
- Wilkinson V M e Gould G W (1996). Food Irradiation. A Reference Guide, WOODHEAD PUB LIM, England.

5. Assessment:

Continuous assessment: written project and oral presentation group work.

Exam Evaluation: Exam (minimum mark 9.5).

6. Estimated Workload:

168

 Hours

7. Last Update:

19/7/2010
