

Course Unit	Food Engineering Project		Field of study	Engineering and engineering trades	
Bachelor in	Food Engineering		School	School of Agriculture	
Academic Year	2022/2023	Year of study	3	Level	1-3
Type	Semestral	Semester	2	ECTS credits	6.0
Code	9087-641-3202-00-22				
Workload (hours)	162	Contact hours	T -	TP -	PL -
			TC -	S -	E -
			OT -	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Ana Isabel Geraudes Rodrigues, Elsa Cristina Dantas Ramalhosa

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Learn how to plan a project of a food process;
2. Know and learn to structure a problem in order to make it solvable;
3. Identify, from the knowledge of various problems, the variables of a mass balance and energy balance of a given process, consisting of different unit operations;
4. Integrate the knowledge acquired in order to develop pictorial flowcharts and proper layout to a given process;
5. Identify and select through process flowcharts, equipment of the main process units and auxiliary equipment needed to that process;
6. Able to dimension and select equipment for a given food process and prediction of losses percentages in the process;
7. Determine and analyze the capital and operating costs for a given installation and respective laboring;
8. Discuss and select, based on operating costs, the sale price of the food product which process was designed, and validation of the project through an economic evaluation of the same.

Prerequisites

Before the course unit the learner is expected to be able to:

1. Have knowledge of biochemistry and food chemistry;
2. Have knowledge of unit operations.

Course contents

1. Industrial project

Course contents (extended version)

- 1. Industrial project
 - 1. 1 Stages of a project;
 - 1. 2 Market research and location;
 - 1. 3 Raw materials and additives;
 - 1. 4 Production process in the food industry. Process flow diagrams (pictorial and blocks);
 - 1. 5 Layout of a food production unit. Production schedules;
 - 1. 6 Industrial equipment;
 - 1. 7 Auxiliary services and associated facilities;
 - 1. 8 Cost analysis;
 - 1. 9 Wastewater treatment;
 - 1. 10 Safety and hygiene.

Recommended reading

1. Brennan, J. G. Butters, J. R. (1990) Food Engineering Operations. Elsevier Applied Sciences.
2. Fellows, P. (1990) Food Processing Technology – Principals and Practice. Ellis Horwood, New York.
3. Huang, Y. , Whittaker, A. D. , Lacey, R. E. (2000) Automation for Food Engineering – Food quality quantization and process control. CRC Press. New York
4. Irudayaraj, J. (2002) Food Processing Operations Modeling – Design and Analysis. Mapcel Dekker. New York.
5. KressRogers, E. , Brimelow, C. J. B. (2001) Instrumentation and Sensors for the Food Industry. CRC Press. New York.

Teaching and learning methods

It will be used the teaching methodology, entitled "Problem Based Learning (PBL)". A problem in a food industry scenario will be presented and it is expected that students take on a specific role in solving the proposed project, they must be able to select which solution is the best option for the project success, and, validation and presentation of the solution.

Assessment methods

1. Evaluation - (Regular, Student Worker) (Final, Supplementary)
 - Reports and Guides - 20% (- Partial project reports (50%) - Project Planning and Management (10%))
 - Laboratory Work - 20%
 - Final Written Exam - 60% (Final report, oral presentation and defense of the work.)
2. Evaluation (optional) - (Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 50% (- Evaluation of written work)
 - Presentations - 50% (- Evaluation of the presentation and discussion of the work.)

Language of instruction

Portuguese

Electronic validation

Ana Isabel Geraudes Rodrigues, Elsa Cristina Dantas Ramalhosa	António Manuel Coelho Lino Peres	Elsa Cristina Dantas Ramalhosa	José Carlos Batista Couto Barbosa
07-12-2022	07-12-2022	07-12-2022	09-12-2022