Course Unit	Subsidiary Industries and Oenological By-Products			Field of study	Food Industries		
Bachelor in	Oenology			School	School of Agriculture		
Academic Year	2022/2023	Year of study	3	Level	1-3	ECTS credits	6.0
Type	Semestral	Semester	1	Code	9998-705-3102-00-22		

Workload (hours)	162	Contact hours	T	TP	PL	TC	S	E	OT	O
			30	30	-	-	-	-	4	-

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): Elsa Cristina Dantas Ramalhosa, José Carlos Batista Couto Barbosa

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Identify the products and materials of subsidiary industries: cooperage, glass, cork, and packaging.
2. To know the main physical, chemical and technological properties of the materials used by the subsidiary industries for the manufacture of the products.
3. To know the applications and the use of the products of the subsidiary industries.
4. To know and characterize the by-products of the wine, taking into account its use and valorization.
5. To know the technologies and main equipment associated to the production of the by-products of the wine.

Prerequisites

Before the course unit the learner is expected to be able to:
Have knowledge of viticulture and technonoly of wines

Course contents

Subsidiary industries: Basic concepts about physical, chemical and technological properties of materials. Wood and cooperage. Bottles and other containers. Bottling, cork and sealants. Packaging. By-products of vinification.

Course contents (extended version)

1. Introduction
   - Purpose and objectives of the Subsidiary Industries and By-products curricular unit.
   - Documentation and bibliography.
   - Evaluation of the curricular unit.
2. Basic concepts about physical, chemical and technological properties of materials
   - Classification of materials.
   - Main properties of wood, cork, glass and steel.
   - The properties that enable the use of these materials
3. Wood and cooperage
   - wooden containers: wine kite, cask, wine barrel
   - Trees and wood for cooperage
   - Oak wood: characteristics and qualities
   - Oaks for cooperage: main species and origins
   - Cooperage: wood cutting, drying and ripening
   - Cooperage: wood burning and toasting
   - Cooperage: other technological processes for the manufacture of the wooden containers
   - Characteristics and use of wood in oenology
   - Species of oak trees and their influence on technological processes in cooperage
   - The alternatives to oak barrels
4. Bottles and other containers
   - Glass and the bottle manufacturing process
   - Bottles: shape and component parts
   - Bottles: formats, capacity and utilization
   - Bottle labels and printed information
   - Packaging and boxes for bottles
   - Other wine packagings: concepts and benefits
   - Bag-in-box: characteristics and use
   - Tetra Pack: characteristics and use
5. Bottling: cork and sealants
   - The cork and the manufacture of stoppers
   - Types of cork stoppers
   - Characteristics and use of cork stoppers
   - Other stoppers and seals from other materials
   - Caps: functions and materials
   - Sealing wax: materials and characteristics
6. By-products of vinification
   - Bagasse: stalks, shale and grains. Polyphenols, oils, tannins/anthocyanin, pullulan, adsorbents.
   - Lees.
   - "Sarros" (Deposits).
   - Wine spirits: types of wine spirits, distillers and aging.
   - Ethyl alcohol.
   - Tartaric acid.
   - Vinegars: types of vinegars and fermentation conditions.
   - Compost fertilizer.

Recommended reading

1. Dubrion, Roger Paul (2014) Le bois et le vin. Editions France Agricole, Paris.
2. APCOR (2015) Manual técnico. Rolhas. . APCOR, Associação Portuguesa da Cortiça.
3. Liberati, Domenico (2016) Los tapones sintéticos en enologia. Ediciones Mundi-Prensa, Madrid.
4. Oreopoulou V. and Russ W. (2006). Utilization of By-Products and Treatment of Waste in the Food Industry. Springer.
5. Catálogos e documentação de fabricantes e indústria de tanoaria, vidro, cortiça e outros materiais e equipamentos.

Teaching and learning methods

Theoretical classes - the teacher will present the topics, using the expository method and sometimes to the demonstrative method; Theoretical-Practical classes - discussion of practical cases, using demonstrative and active methods. Laboratory works.

Assessment methods

1. Continuous assessment - (Regular, Student Worker) (Final)
   - Practical Work - 60%
   - Intermediate Written Test - 20%
   - Final Written Exam - 20%
2. Final Evaluation - (Regular, Student Worker) (Final, Supplementary, Special)
   - Final Written Exam - 100% (Final evaluation: written examination (40%) and practical examination (60%))

Language of instruction

Portuguese

Electronic validation

Elsa Cristina Dantas Ramalhosa, José Carlos Batista Couto Barbosa	Maria Fátima Alves Pinto Lopes da Silva	António Castro Ribeiro	José Carlos Batista Couto Barbosa
07-12-2022	08-12-2022	19-12-2022	19-12-2022