INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Oenological Chemistry			Field of study	Chemistry		
Bachelor in	Oenology			School	School of Agriculture		
Academic Year	2023/2024	Year of study	1	Level	1-1	ECTS credits	6.0
Type	Semestral	Semester	2	Code	9998-705-1205-00-23		

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): Vitor Manuel Ramalheira Martins

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Identify the chemical components of the grape clusters, must and wine
2. Know the main chemical reactions that occur during grape ripening, winemaking and wine aging operations and understand their impact on wine characteristics
3. Know the main accidents of physical and chemical nature, identify their main causes and know how to minimize their impact on wine characteristics

Prerequisites

Before the course unit the learner is expected to be able to:
1. To identify the distinct types of macromolecules and understand their biological functions.
2. To distinguish the main proteins, lipids, and carbohydrates
3. Understand the energetic metabolism of the cell.

Course contents

Structure of the grape clusters. Chemical composition of must and wine. The transformation of must into wine. Reactions during wine maturation and aging. Physical and chemical accidents. Oenological role of the different components of wines.

Course contents (extended version)

1. Structure of the grape clusters
   - Stem;
   - Grape berrie;
   - Seed;
   - Skin.
2. Chemical composition of must and wine
   - Sugars;
   - Organic acids;
   - Polyphenols;
   - Compounds responsible for the aroma;
   - Pectic compounds;
   - Nitrogen compounds;
   - Vitamins;
   - Minerals.
3. The transformation of must into wine
   - Glycolysis and alcoholic fermentation;
   - Malolactic fermentation;
   - Clarification.
4. Reactions during wine maturation and aging
   - Oxidative processes (enzymatic and non-enzymatic);
   - Non-oxidative processes.
5. Physical and chemical accidents
   - Ferric Casse;
   - Oxidasic casse;
   - Cupric casse;
   - Protein casse.

Recommended reading

1. Cardoso, A. D. 2020. O vinho da Uva à Garrafa. Agrobook, Portugal;
2. Moreno, J. e Peinado, R. 2012. Enological Chemistry. Academic Press, London;
3. Moreno-Arribas, M. V. ; Polo, M. C. 2009. Wine Chemistry and Biochemistry. Springer, New York;
4. Ribéreau-Gayon, P. ; Glories, Y. ; Maujean, A. e Dubourdieu, D. 2006. Handbook of Enology - The Chemistry of Wine Stabilization and Treatments, Second Edition. John Wiley & Sons, New York;
5. Grainger, K. e Tattersall, H. 2005. Wine Production: Vine to Bottle. Blackwell Publishing, Oxford.

Teaching and learning methods

Theoretical classes: lecture, questioning and active methods. Practical classes: demonstrative, questioning and active methods, in laboratory.

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
   - Intermediate Written Test - 35% (Minimum mark of 8,0 values (0 - 20 values scale))
   - Reports and Guides - 15%
   - Presentations - 15%
   - Final Written Exam - 35% (Includes the topics that were not evaluated in the intermediate written test)
2. Alternative 2 - (Regular, Student Worker) (Supplementary, Special)
   - Reports and Guides - 15%
   - Presentations - 15%
   - Final Written Exam - 70% (Inclui todos os tópicos da unidade curricular)
3. Alternative 3 - (Student Worker) (Final, Supplementary, Special)
   - Final Written Exam - 100% (Includes all the topics of the curricular unit)

Language of instruction

1. Portuguese
2. Portuguese, with additional English support for foreign students.

Electronic validation

Vitor Manuel Ramalheira Martins	Clementina Maria Moreira dos Santos	António Castro Ribeiro	José Carlos Batista Couto Barbosa
18-01-2024	18-01-2024	29-01-2024	29-01-2024