

**COURSE DATA****Data Subject**

Code	33990
Name	Enology
Cycle	Grade
ECTS Credits	4.5
Academic year	2021 - 2022

Study (s)

Degree	Center	Acad. year	Period
1103 - Degree in Food Science and Technology	Faculty of Pharmacy and Food Sciences	4	First term

Subject-matter

Degree	Subject-matter	Character
1103 - Degree in Food Science and Technology	36 - Enology	Optional

Coordination

Name	Department
GUILLAMON NAVARRO, JOSE MANUEL	265 - Prev. Medicine, Public Health, Food Sc.,Toxic. and For. Med.
QUEROL SIMON, AMPARO MERCEDES	265 - Prev. Medicine, Public Health, Food Sc.,Toxic. and For. Med.

SUMMARY

Enology is an elective subject in the fourth year of the Degree in Food Science and Technology, at the Faculty of Pharmacy, University of Valencia. This subject has a total of 4.5 ECTS.

The aim of the subject is to provide a general knowledge of the science of the wine, through the review of the technological, biochemical and microbiological aspect most important wine-making, including both concepts of alcoholic fermentation and the malolactic fermentation. Oenological practices are reviewed from receipt of raw materials to bottling including the different winemaking techniques, microbiological alterations and wine biotechnology.



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

To study the subject is of interest to have basic knowledge of chemical engineering, production of raw materials, food microbiology and biotechnology.

OUTCOMES

1103 - Degree in Food Science and Technology

- Manufacture and preserve food.
- Conocer los fundamentos de la fabricación del vino a través de la comprensión de sus aspectos tecnológicos, bioquímicos y microbiológicos.

LEARNING OUTCOMES

- To know the stages of technological process of production of wine in its different variants and understand the importance of each stage.
- Understand the importance of microorganisms involved in the winemaking process and their role both beneficial and harmful.
- To know and apply the main techniques of isolation, enumeration and identification of microorganisms of wine.
- To know and apply the methodologies to determine the main oenological parameters and their importance in the wine.
- Know the main applications of biotechnology of wine to improve the wines and the production processes.

DESCRIPTION OF CONTENTS

1. Technology of wine making



TOPIC 1. Raw material: description of the grape and grape varieties.

Description of maturation of the grapes. Grape composition at the time of harvest. Developments during the maturation of the main components of the grape. Fixing the dates of harvest. Grape varieties.

TOPIC 2. Preliminary operations.

Winery cleaning. Transport of the grape. Adjusting the pH. Employment and roles of sulfur dioxide. Cooling systems. Fermentation rooms.

TOPIC 3. Vinification techniques.

Destemming. Crushing. Pressing. Thermovinification. Clarification of wines.

TOPIC 4. Red wines.

Maceration. Time in barrel. Practical racking. Conservation under nitrogen. Carbonic maceration.

TOPIC 5. Production of white and rosé wines.

White vinification. Rosé vinification.

TOPIC 6. Special vinification.

Wines produced by champenoise method. Sparkling wines. Sherry wines. Sweet wines

2. Wine Microbiology

TOPIC 7. Yeasts involved in vinification.

Alcoholic fermentation. Isolation, counts and identification. Morphological, physiological and genetic features of yeasts. Growth of yeasts during alcoholic fermentation. Sugar metabolism, nitrogen compounds and organic acids. Nutritional requirements of yeasts. The killer factor. Selection and starter cultures.

TOPIC 8. Lactic acid bacteria involved in vinification.

Malolactic fermentation. Isolation, counts and identification. General characteristics of lactic acid bacteria: morphology, structure, physiology, biochemistry and genetics. Evolution of bacterial populations. Use of selected lactic bacteria in wine. Selection criteria. Development of a natural starter culture. Nutritional requirements.

TOPIC 9. Microbial spoilage of wines.

Changes caused by yeasts. Spoilage by lactic acid bacteria. Changes caused by acetic acid bacteria. Spoilage by other filamentous fungi in grapes and wines.

TOPIC 10. Botrytis infection.

Cycle. The process of infection. Gray rot, chemical and microbiological changes. Botrytis grapes vinification. The noble rot. Control of *B. cinerea*. Determination of the infection.

TOPIC 11. Biotechnology of wine.

Genetic improvement of wine yeasts by classical techniques. Genetic improvement of wine yeasts by recombinant DNA technology. Use of enzymes in winemaking

3. Laboratory work

1. Making a microvinification with addition of sulfur dioxide and inoculation with selected yeast.
2. Analytical and microbiological control of the vinification.
3. Morphological analysis of yeast and lactic bacteria.
4. Visit a winery.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	25,00	100
Laboratory practices	15,00	100
Seminars	2,00	100
Tutorials	1,00	100
Development of group work	10,00	0
Development of individual work	5,00	0
Study and independent work	10,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	20,00	0
Preparing lectures	10,00	0
Preparation of practical classes and problem	7,50	0
TOTAL	110,50	

TEACHING METHODOLOGY

Method	Hours
Seminars	2
Theory	25
Practice	15
Tutoring	1

Teaching is based on the individual study of the topics that will be reinforced with the organization of **tutoring**. Prior to the date of tutoring, the student must have prepared the proposed activities to reinforce the learning of specific aspects of the program. **Classes** are taught using audio-visual equipment. The student will have this material available in the virtual classroom.



The **laboratory work** will favor the relationship between knowledge and its application to practice. Prior to visit the lab, be provided a booklet with the procedures, as well as a number of issues and problems that students must solved and return the teacher within a certain time.

Will be conducted **seminars** on topics suggested by the teacher and related to the subject. The preparation of the seminar will be supervised by the teacher. The work shall be in writing and will be presented by students.

EVALUATION

- a) Producing, presentation and defense of works related to the contents explained and discussed in the classroom related to one of the subjects studied during the semester (coordinated seminars). Written work will be evaluated and the level of understanding of the content and skills to their exposure, advocacy and discussion. (10%).
- b) Evaluation of theoretical content established for the subject through a written test. A minimum of 4 points out of 10 in this test is needed to pass the subject (60%).
- c) Evaluation of laboratory work through a written test that will reflect the work done and the ability to solve the experimental problems raised, and, optionally, assess the ability to make well-detailed and organized reports of experimental results. A minimum of 4 points out of 10 in this test is needed to pass the subject. (20%).
- d) Evaluation of the work during the **tutorials** which will consist in the preparation and defense of an uncoordinated seminar on topics related to the subject. (10%).

To pass the subject, you must obtain 5 or more points out of 10 both in the weighted sum of sections b) and c), and in the final grade, considering all evaluable activities.

To obtain “with honors” mention (matrícula de honor), it is a preferred criterion to pass the subject in the first convocation.

Attendance at practices is obligatory for passing the subject except for those students that have undertaken these classes previously. Unjustified non-attendance to tutorials and coordinated seminars imply zero points in the corresponding evaluation section except for those students that have undertaken these classes in previous years.

REFERENCES

Basic



- Blouin J., Peynaud, E. 2003. Enología práctica Ed. Mundi-prensa. Madrid
- Suarez-Lepe J.A., Iñigo-Leal, B. 1992. Microbiología Enológica. Mundi-Prensa, Madrid.
- Amerine, M.A., Berg, H.W., Kunkee, R.E., Ough, C.S.; Singleton, U.L. and Webb, A.D. 1982. The technology of wine making. AVI Publishing Company. Westport C.Y.
- Ough C.S. 1996. Tratado básico de enología. Ed. Acribia. Zaragoza.
- Carrascosa A.V.; Muñoz, R., González R. 2005. Microbiología del vino. AMW Ediciones. Madrid.

Additional

- Fleet, G.H. 1992. Wine microbiology and biotechnology. Harwood Academic Publishers.
- Jackson R. S. 1994. Wine Science. Principles and Applications. Academic Press.
- Boulton, R. B., Singleton, V. L., Kunkee, R. E. 1996. Principles and practices of winemaking. The Chapman & Hall Enology Library

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

3. Teaching methodology

Theory classes: 100% of the planned theory classes will be taught. If they could not be face-to-face in the classroom, they will be held by synchronous videoconference through the Blackboard Collaborate application, respecting the schedule programmed.

Practical classes: If due to limitations in capacity, 100% of the practical contents cannot be taught in the laboratory, complementary non-contact activities will be carried out using audio-visual material and the discussion of practical cases.

4. Evaluation

Continuous assessment: The theoretical contents will be divided into 4 blocks. At the end of the theoretical classes of each block, it will be evaluated.

The average grade obtained in these partial evaluations will be 50% of the grade corresponding to the theoretical test and the final theoretical test will be the other 50%.

If the average grade of the 4 partial tests does not exceed 40%, some of the 4 tests have not been performed, or the average grade is lower than that of the final theory test, the grade of the partial tests will be ignored.