



UNIVERSITÀ DEGLI STUDI DI PALERMO

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| DEPARTMENT | Scienze Agrarie, Alimentari e Forestali | | |
| ACADEMIC YEAR | 2019/2020 | | |
| BACHELOR'S DEGREE (BSC) | VITICULTURE AND OENOLOGY | | |
| INTEGRATED COURSE | QUALITY CONTROL IN THE WINE INDUSTRY | | |
| CODE | 19153 | | |
| MODULES | Yes | | |
| NUMBER OF MODULES | 2 | | |
| SCIENTIFIC SECTOR(S) | AGR/15, AGR/16 | | |
| HEAD PROFESSOR(S) | MOSCHETTI GIANCARLO | Professore Ordinario | Univ. di PALERMO |
| OTHER PROFESSOR(S) | MOSCHETTI GIANCARLO | Professore Ordinario | Univ. di PALERMO |
| | SQUADRITO MARGHERITA | Professore a contratto | Univ. di PALERMO |
| CREDITS | 9 | | |
| PROPAEDEUTICAL SUBJECTS | | | |
| MUTUALIZATION | | | |
| YEAR | 3 | | |
| TERM (SEMESTER) | 1° semester | | |
| ATTENDANCE | Not mandatory | | |
| EVALUATION | Out of 30 | | |
| TEACHER OFFICE HOURS | MOSCHETTI GIANCARLO Monday 11:00 13:00 Palermo, Via delle Scienze, Edificio 5 primo piano Studio Prof. Giancarlo Moschetti Tuesday 11:00 12:00 Palermo, Via delle Scienze, Edificio 5 primo piano Studio Prof. Giancarlo Moschetti | | |

DOCENTE: Prof. GIANCARLO MOSCHETTI

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| PREREQUISITES | The student must have good knowledge of chemistry, biological processes and microbiology |
| LEARNING OUTCOMES | <p>Knowledge and understanding skills</p> <p>Acquire advanced tools for the application of analytical and microbiological techniques in the quality of wine-making sector. Ability to use the specific language of these disciplines.</p> <p>Ability to apply knowledge and understanding</p> <p>Ability to identify and perform in the laboratory, autonomy, analytical and microbiological methods and elaborations necessary for obtaining useful information to the predetermined objective to identify the main characteristics of the matrices studied with the aim of providing the basic knowledge for analytical and microbiological control of the grape maturity and the management of the winemaking process.</p> <p>Judgment autonomy</p> <p>To be able to carry out judgmental analyzes of the implications and results obtained from the analytical and microbiological methods adopted in order to decide on the necessary interventions on matrices of grapes, must and wine, subject of study.</p> <p>Communication skills</p> <p>Ability to expose the results of the analyzes applied, either in written or oral form, and also with an inexperienced audience. Being able to support the common interest in quality and food safety issues.</p> <p>Learning ability</p> <p>Upgrade ability through consultation of the scientific publications of the instrumental and microbiological analysis. Ability to follow, using the knowledge gained in the course, second-level master, undergraduate courses, specialized seminars in the field of instrumental and microbiological analysis.</p> |
| ASSESSMENT METHODS | Verification of learning will take place through the active interaction of students during the lessons but above all in the lab, to evaluate the learning of the theoretical notions delivered during the lessons. For the final exam students will have to take a written in-depth study of a lesson topic. The final exam is an oral interview for verifying the ability of reasoning and linking the acquired knowledge. The evaluation is done in thirteenth. Particularly, a 18/30 evaluation will be carried out for at least basic knowledge of the subject to reach a 30/30 evaluation if the student shows that he has thoroughly understood the analytical and microbiological methods and that he autonomously and critically knows how to apply them to the multiple cases that may occur. |
| TEACHING METHODS | Frontal lessons, classroom and laboratory exercises, technical visit, course on wine off-flavours |

**MODULE
MICROBIOLOGICAL CONTROL**

Prof. GIANCARLO MOSCHETTI

SUGGESTED BIBLIOGRAPHY

Appunti dalle Lezioni
 Trattato di Enologia – Vol. 1: Microbiologia del vino Vinificazioni Vol.1 - Ribereau-Gayon P.; Dubourdieu D.; Doneche B.; Lonvaud A. - Il Sole 24 Ore Edagricole;
 Vincenzini M, Romano P. Farris GA (2005): Microbiologia del vino. Casa Ed. Ambrosiana, Milano.
 Manuale di corretta prassi igienica per la prevenzione dei rischi igienico-sanitari nella produzione enologica siciliana “Regione Siciliana – Istituto regionale della Vite e del Vino”

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| AMBIT | 10689-Attività formative affini o integrative |
| INDIVIDUAL STUDY (Hrs) | 45 |
| COURSE ACTIVITY (Hrs) | 30 |

EDUCATIONAL OBJECTIVES OF THE MODULE

The course provides knowledge on microorganisms associated to the oenological industries, with particular reference to the prevention, care and eventual management of alterative microorganisms responsible for wine off-flavours. Detailed knowledge of the chain control methods will be provided with particular reference to the oenological field. It also provides knowledge to understand the role of alterative microorganisms during fermentation and post fermentation processes and the management of environmental factors to inhibit microorganism growth causing defects in wine. Detailed information on the microbiological risk associated with oenological production and HACCP concepts will be provided. The activities carried out during the classroom and laboratory exercises provide knowledge to solve problems related to the handling of the inoculum of the microbial starter and to the correct recognition of the main alterative agents in the oenological process as well as the recognition of defects through sensory analysis.

SYLLABUS

| Hrs | Frontal teaching |
|------------|-----------------------------------------------------------------------------------|
| 1 | Introduction to the course, Organization of the course, mode of evaluation |
| 2 | HACCP: Hazard Analysis Critical Control Point |
| 2 | HACCP applied in the oenological process |
| 2 | From Harvest to the bottle: critical control points in the HACCP approach |
| 2 | The main alterative microorganisms in harvest and during the fermentation process |
| 2 | The main alteration due to Lactic acid bacteria |
| 4 | The main alterative microorganisms during the aging process |
| 1 | The acetic bacteria |
| 2 | Microbiological issues related to the caps |
| 2 | The manual of good hygiene practice in the oenological industry |
| Hrs | Practice |
| 6 | Sensory recognition of the main defects of wine of microbiological origin |
| Hrs | Workshops |
| 4 | Isolation and identification of <i>Brettanomyces</i> into the wine |

**MODULE
INSTRUMENTAL ANALYSIS**

Prof.ssa MARGHERITA SQUADRITO

SUGGESTED BIBLIOGRAPHY

-REGOLAMENTO CEE N. 2676/90.
-P. Ribereau-Gayon, D. Duboudieu, B. Doneche, A. Lonvaud. Trattato di Enologia vol. I, Edizione italiana Edagricole, Bologna
-P. Ribereau-Gayon, D. Duboudieu, B. Doneche, A. Lonvaud. Trattato di Enologia vol. II, Edizione italiana Edagricole, Bologna

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| AMBIT | 10689-Attività formative affini o integrative |
| INDIVIDUAL STUDY (Hrs) | 90 |
| COURSE ACTIVITY (Hrs) | 60 |

EDUCATIONAL OBJECTIVES OF THE MODULE

The objective of the module is to provide students with the basic knowledge to apply chemical-physical analytical procedures on vinegrowing products in quality control and oenological processes. The main chemical-physical analytical determinations of oenological interest will be studied and performed by frontal lessons and individual exercises aimed at the identification of parameter data related to basic analytical, acid and glucose composition, polyphenolic component and parameters Chromates of musts and wines, with critical evaluation of the results achieved, on the basis of the legal limits established by the existing Community regulation. Instrumental analytical techniques concerning potentiometric and spectroscopic methods, such as UV / Vis spectroscopy, infrared (IR) and mass spectrometry (MS) will be treated. In-depth analysis of instrumental analysis will also cover chromatographic techniques such as liquid phase chromatography (HPLC) and gas phase (GC).

SYLLABUS

| Hrs | Frontal teaching |
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| 1 | Objective of the course |
| 3 | Communitarian analysis methods to be used in the wine sector. Regulation (EEC) No 2676/90. Legal Limits. The errors in the analytical determinations. Evaluation of analytical data. Repeatability - Reproducibility - Accuracy |
| 3 | Bulk density and relative density. Volume alcohol volume. Total dry extract. Ashes. Alcoholicity of ashes. Potentiometry. pH. Total acidity. Volatile acidity. Organic acids. Refractometry. Reducing sugars. Free and total sulfur dioxide. Sulphates. Chlorides. Assimilable nitrogen. Aldehyde acetic acid. |
| 3 | Spectroscopy UV/Vis, infrared (IR). |
| 4 | Spectrophotometric determinations: wine spectrum (E420, E520, E620, color intensity, tonality); Wine color separation at 520 nm, pH of wine and pH 0 (dTAT, non-sensitive SO ₂ pigments); Total anthocyanins; Anthocyanin monomers; Total flavonoids; Total proanthocyanides; P-DAC reactive flavans; Flavin reagents to vanillin; Index of total polyphenols to Folin-Ciocalteu. Solid phase extraction of the phenolic compounds of wine. |
| 2 | Adjusted concentrate (MCR) and legal limits. Enzyme analysis. Glucose-Fructose. Citric acid. Malic acid and lactic acid |
| 2 | Liquid column chromatography (HPLC) and thin layer (TLC); Gas phase chromatography (GC) and massspectrometry (GC / MS). |
| 2 | Determination of liquid chromatography (HPLC): anthocyanin profile; Hydroxycinnamic acids; flavonols |
| Hrs | Workshops |
| 40 | Individual execution of the main analytical determinations of musts and wines: chemical-physical composition, polyphenolic composition by UV / Vis spectroscopy and liquid chromatography (HPLC). |