Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	Food and Wine Science and Technology and Recovery Methods of Agro-food By-products
Course code	40410
Scientific sector	AGR/15
Degree	Bachelor Enogastronomy in Mountain Areas
Semester	II
Year	II
Academic year	2024/25
Credits	12
Modular	No

Total lecturing hours	60 + 18
Total lab hours	30 + 12 + 12
Total exercise hours	-
Attendance	Strongly recommended
Prerequisites	Basic knowledge of mathematics, physics, chemistry
Course page	Course Offering / Free University of Bozen-Bolzano (unibz.it)

Specific educational objectives	• type of course: *area caratterizzante* • the scientific area: Food and Wine Science and Technology • the course is part of the common study program The course gives a general overview of scientific contents. It is designed for acquiring professional skills and knowledge in the field of food and wine sciences and recovery methods of agro-food byproducts. It is divided into two parts, one related to food science and the other related to wine science with different lecturers. Educational objectives (a) provide an adequate knowledge and critical approach to develop projects related to the production of various types of food and wine products, taking into account technologies currently applied; (b) provide an adequate knowledge on chemical/instrumental approaches to determine food and wine quality.

Lecturer	Prof. Giovanna Ferrentino, NOITech Park, A2 building, via Ipazia 1, Bolzano, giovanna.ferrentino@unibz.it https://www.unibz.it/en/faculties/sciencetechnology/academic-staff/person/36045-giovanna-ferrentino

	Dr. Antonella Luciana Grosso, NOITech Park, A2 building, via Ipazia 1, Bolzano, antonellaluciana.grosso@unibz.it Prof. Emanuele Boselli, Office: NOITech Park Alto Adige/Südtirol - Room A2.3.03b, Via A. Volta, 13B - Bolzano, e-mail: emanuele.boselli@unibz.it; phone 0471017217, Emanuele Boselli / Libera Università di Bolzano (unibz.it)
Scientific sector of the lecturer	AGR/15
Teaching language	English
Office hours	before and after the lectures or upon appointment
Teaching assistant	Dr. Savchina Ecaterina, NOI Technology Park, A2 building, via Ipazia 1, Bolzano, ecaterina.savchina@student.unibz.it; Dr. Wasim Akhtar, NOI Technology Park, A2 building, via Ipazia 1, Bolzano, wasim.akhtar@student.unibz.it
Office hours	before and after the lectures or upon appointment
List of topics covered	Prof. Ferrentino/Dr. Grosso (90 h in total): Introduction to the study of food science and technology - General definitions - Physical quantities - Nutritional labeling - Basic concepts on macronutrients present in foods Definition and construction of Table of food nutrients Stability of food products: - water activity - pH - total acidity Technology for preserving food products - pasteurization - sterilization - blenching - cooking - evaporation Technologies for homogenization and emulsification - Mechanical stirring - Ultrasounds - High pressure homogenization Extraction technologies for the recovery of agro-food by-products - Maceration - Percolation - Ultrasounds - Supercritical fluids Prof. Boselli (30 h in total); this part is shared with the Enology module of the Bachelor in Agricultural, Food and Mountain Environmental Sciences: • Harvest decisions, grape ripening, sampling • Crushing and destemming, must handling, must additions and pressing; • Fermentation biochemistry, yeast selection and inoculation, stuck fermentations; • Malolactic fermentation (MLF), wine

	style and MLF, controlling MLF; • Barrel aging, clarification, fining, settling, cold stabilization, filtering, blending, bottling, closure systems • Introduction to sensory evaluation of wines; • White and red winemaking, protection from oxidation, use of enzymes, maceration and stabilization techniques • Fundamentals of sparkling wine production • Use of the byproducts of the winery
Teaching format	Classroom learning, exercises, projects.

Learning outcomes	Knowledge and understanding (a) adequate knowledge and understanding about the development of projects related to the production of food and wine products, taking into account the technologies applied in the industries; (b) provide an adequate knowledge of the aspects related to chemical/instrumental approaches to determine the quality of wine and food products. Applying knowledge and understanding (a) developing the capability of integration of information, both in horizontal way (technological, chemical, biological, and regulatory aspects involved in each processing technology) and in vertical way (reasonable sequence of processes along the food and wine production chain); (b) capability of carrying out strategies for the description of the technologies used in the food and wine sector; (c) capability of applying the right chemical/instrumental technique to assess food and wine quality. Making judgments Capability of identifying the information needed to use sustainable technologies and to ensure/evaluate the quality of food and wine products with instrumental techniques. Communication skills Capability of clearly and exhaustively communicate notions, ideas, problems and technical solutions to interlocutors, either professional or not, representative of the various and specific competencies in the food and wine supply chain (agronomists, engineers, biologists, chemists, nutritionists, administrators). Learning skills To get the learning skills that are necessary to get knowledge about food and wine processes and to strategies for the recovery of agro-food by products.

Assessment	Oral exam with a PowerPoint presentation as concerns

	the topics taught by Prof. Ferrentino and reports on laboratory activities carried out by Dr. Grosso; PowerPoint presentation as concerns the topics taught by Prof. Boselli
Assessment language	English
Evaluation criteria and criteria for awarding marks	Successful completion of the examination will lead to grades ranging from 18 to 30 with honors. • clarity of the presentation and the answers during the discussion, mastery of language (also concerning teaching language), ability to summarize, evaluate, and establish relationships between topics; critical thinking.

Required readings	• Keynotes and scientific papers provided by the lecturers • Food science and the culinary arts. Edited by Gibson, M. (2018). Academic Press. • Gastronomy and food science. Edited by Charis M. Galanakis (2021). Elsevier Academic press. • Introduction to the Chemistry of Food. Edited by Michael Zeece (2020). Elsevier Academic press.
Supplementary readings	• Ribéreau-Gayon P., Dubourdieu D., Donèche B., Lonvaud A. – Handbook of Enology – Vol. I and II (free pdf version available on the internet) • OIV technical standards and documents http://www.oiv.int/en/technical-standards-and-documents • Introduction to Wine laboratory practices and procedures, JL Jacobson, Springer