Syllabus

Course Description

Course Title	Plant Biodiversty and Sustainable Cultivation Methods
Course Code	40454
Course Title Additional	
Scientific-Disciplinary Sector	
Language	English
Degree Course	Bachelor in Food and Enogastronomy Sciences
Other Degree Courses (Loaned)	
Lecturers	Prof. Damiano Zanotelli, Damiano.Zanotelli@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/18696 dr. Maria Dolores Asensio Abella, MariaDolores.AsensioAbella@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/45187 dr. Fiona Jane White, FionaJane.White@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/50468
Teaching Assistant	
Semester	Second semester
Course Year/s	1st
CP	12
Teaching Hours	72
Lab Hours	48
Individual Study Hours	180
Planned Office Hours	36
Contents Summary	Plant biodiversity and environmental impact assessment (6 credits EN): Basic knowledge of biodiversity, agrobiodiversity, with particular

	regard to vegetation, ecosystems, landuse systems, and landscapes; Overview on concepts, methods, and approaches of plant diversity assessment; Structure and functions of plant organs; Basic information on plant systematic; Overview on edible plants of mountain areas with examples, referring to their ecology; Sustainable foraging and wild edible plants; Ecosystem restoration for useful plants; Wild plant identification in the lab and in the field. Sustainable cultivation methods and quality of products for food processing (6 credits EN): The educational objectives of the module "Sustainable cultivation methods for quality production" are to provide students with scientific and technical knowledge on the main principles of primary production. In detail, sustainable cultivation methods of production will be considered especially under the framework of the mountain environment. Students will be provided with an overview on the main aspects of products' quality and technologies to obtain and maintain quality of agricultural products.
Course Topics	This course provides an integrated overview of plant biodiversity, agroecosystem functioning, and sustainable agricultural production, with a particular focus on environmental sustainability and food quality. In the first module (Plant biodiversity and environmental impact assessment), students will explore the principles of biodiversity and agrobiodiversity, methods to assess plant diversity in natural and managed ecosystems, and the structure and ecological adaptations of plants, with emphasis on edible species. The second module (Sustainable cultivation methods and quality of products for food processing) addresses key challenges of the agri-food sector, including mountain agriculture, resource-use efficiency (soil, water, light, and nutrients), plant–environment interactions, climate variability, sustainable cultivation methods and agroecological principles. It also covers quality criteria for agricultural products at harvest and their suitability for fresh consumption or processing, with particular attention to cereals, legumes, tubers, oilseeds, fruits, and vegetables, including basic principles of viticulture and apple

	growing, also addressed during field visits.
Keywords	Plant biodiversity; Plant ecology; Ecosystems; Edible plants; Plant identification; Sustainability; Agricultural resources, resource use efficiency, agroecology, Food production, Food quality
Recommended Prerequisites	Familiarity with fundamental concepts of plant biology, ecology, and agricultural systems is recommended. However, all key topics and terminology will be introduced from the beginning of the course, allowing students with diverse backgrounds to fully benefit from the teaching activities.
Propaedeutic Courses	None
Teaching Format	Frontal lectures, field excursions, laboratory activity, interaction with local stakeholders, group projects. Innovative teaching methods: (a) Group activities among participants (collaborative problem solving).
Mandatory Attendance	No
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding: Upon completion of their studies, graduates with a bachelor's degree in Food and Enogastronomy Sciences will have acquired a solid foundation of scientific knowledge in disciplines such as chemistry, physics, biology, mathematics, computer science, and law, specifically applied to the food and gastronomic sector. They will gain technological skills for managing production and transformation processes, along with an integrated view of the quality, safety, and sustainability of food supply chains and systems. In addition, graduates will understand the principles related to waste reduction, resource optimization, and the reconciliation of economics and ethics, which are central elements for addressing the modern challenges of the agri-food system. The knowledge and understanding skills mentioned above are acquired through participation in lectures, practical exercises, seminars, and through guided personal study and individual study as provided by the activated educational activities. The verification of the achievement of learning outcomes is mainly carried out through exams and any interim tests. The tests may be written and/or oral, and may also consist of reports and oral

	presentations of projects or seminars. Ability to apply knowledge and understanding: The educational activities are designed to strengthen the autonomy of judgment and the ability to make decisions in complex contexts, as well as to develop communication skills and the ability to work in multidisciplinary and international teams. At the end of the program, graduates will be able to independently apply their knowledge in professional contexts, promoting innovative and sustainable solutions for the challenges of the agri-food and gastronomic system. The achievement of the ability to apply knowledge is accomplished through critical reflection on the texts proposed for individual study, stimulated by classroom activities, the study of research and application cases presented by the professors, the performance of practical laboratory exercises, fieldwork, bibliographic research, the completion of individual and/or group projects included in the core and elective courses of the curriculum, as well as during internships and the preparation of the final exam. The assessments, carried out through written and/or oral exams, reports, and exercises, involve the completion of specific tasks in which the student demonstrates mastery of tools, methodologies, and critical autonomy. During internships, the assessment is conducted through the presentation of a report by the student to the supervising professor. Making judgements: Evaluate and critically analyze the quality, safety, and sustainability of production processes and food products, considering scientific, technological, economic, and cultural aspects. Students will be able to make informed decisions based on scientific data and the analysis of production contexts to ensure the excellence of the final product. Communication skills: Communicate effectively and appropriately with both technical and non-technical interlocutors, including professionals in the food and gastronomic sector, public and private institutions, and the general public. This includes the ability to adapt the communication style based on the audience, using the specific technical language of the

	food and gastronomic sector when necessary. Present and discuss the results of their analyses and research in both written and oral form, using technological and multimedia tools. Graduates will be able to draft technical reports, research papers, and scientific documents, as well as present their results clearly and structured, for example during conferences, seminars, or business meetings. Actively participate in discussions and group work in multidisciplinary and international contexts, demonstrating active listening, negotiation, and collaboration skills. Practical experiences and internships will provide students with the abilities to work effectively in teams and contribute to solving complex problems in the sector. Use the three languages of instruction of the course (Italian, German, and English) fluently and confidently, both for written and oral communication. Thanks to the trilingual approach of the Free University of Bozen-Bolzano, graduates will be able to face international work contexts, participate in global networks, and contribute to the development of international cooperation projects to address the challenges of the food and gastronomic sector. Learning skills: At the end of the degree program, graduates will have developed strong learning skills, essential for successfully continuing academic studies and entering the workforce. In particular, they will be able to: Learn autonomously and continuously, keeping up to date with scientific and technological advancements in the food and gastronomic sector. Graduates will have acquired study methods and research tools that will allow them to independently update their skills, critically interpreting new knowledge. Effectively manage the learning of complex concepts by integrating the various scientific and technical disciplines covered in the degree program, such as chemistry, biology, food technologies, economics, and law. They will be able to identify the most relevant sources, understand and apply new methodologies, and adapt to sector developments. Develop collaborative learning strategies, thanks to the experience gained through group work, internships, and laboratory activities. Graduates will be able to share their knowledge and learn from

	others, demonstrating adaptability and teamwork skills. Continue their studies independently in Master's degree programs (such as the LM-70 class, Food Science and Technology, currently offered at the same university) or in other related fields, using the skills and methods acquired during the bachelor's degree to tackle new learning challenges, even in high-level academic and professional contexts.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	The two modules will have separate assessment methods: - Written exam and oral presentation for Plant biodiversity and environmental impact assessment - oral exam and evaluation of a project work for Sustainable cultivation methods and quality of products for food processing The final grade is the arithmetic mean of the grades obtained in the two 6-ECTS modules.
Evaluation Criteria	Clarity of answers; language skills (with respect to the teaching language); ability to summarise, evaluate, and establish relationships between topics.
Required Readings	Lecture materials shown in class and provided by the lecturer on the dedicated Teams platform.
Supplementary Readings	
Further Information	
Sustainable Development Goals (SDGs)	Zero hunger, Good health and well-being, Climate action, Responsible consumption and production, Clean water and sanitation

Course Module

Course Constituent Title	Plant Biodiversity and Environmental Impact Assessment
Course Code	40454A
Scientific-Disciplinary Sector	BIOS-01/C
Language	English
Lecturers	dr. Fiona Jane White, FionaJane.White@unibz.it

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Teaching Assistant	
Semester	Second semester
CP	6
Responsible Lecturer	
Teaching Hours	36
Lab Hours	24
Individual Study Hours	90
Planned Office Hours	18
Contents Summary	Basic knowledge of biodiversity, agrobiodiversity, with particular regard to vegetation, ecosystems, landuse systems, and landscapes; Overview on concepts, methods, and approaches of plant diversity assessment; Structure and functions of plant organs; Basic information on plant systematic; Overview on edible plants of mountain areas with examples, referring to their ecology; Sustainable foraging and wild edible plants; Ecosystem restoration for useful plants; Wild plant identification in the lab and in the field.
Course Topics	This course introduces students to the principles underlying biodiversity and agrobiodiversity, with a particular focus on plants, ecosystems and landscapes. Students will learn about the methodologies to examine and quantify plant diversity in both natural and managed environments. The course describes the structure and function of plants, including key plant organs and environmental adaptations. There is an emphasis on edible plant species, their ecology, and practices for sustainable foraging.
Teaching Format	Frontal lectures, exercises, and student workshops
Required Readings	Teaching material provided in the dedicated Teams platform
Supplementary Readings	

Course Constituent Title	Sustainable Cultivation Methods and Quality of Products for Food Processing
Course Code	40454B
Scientific-Disciplinary Sector	AGRI-03/A
Language	English
Lecturers	Prof. Damiano Zanotelli, Damiano.Zanotelli@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/18696 dr. Maria Dolores Asensio Abella, MariaDolores.AsensioAbella@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/45187
Teaching Assistant	
Semester	Second semester
CP	6
Responsible Lecturer	
Teaching Hours	36
Lab Hours	24
Individual Study Hours	90
Planned Office Hours	18
Contents Summary	The educational objectives of the module "Sustainable cultivation methods for quality production" are to provide students with scientific and technical knowledge on the main principles of primary production. In detail, sustainable cultivation methods of production will be considered especially under the framework of the mountain environment. Students will be provided with an overview on the main aspects of products' quality and technologies to obtain and maintain quality of agricultural products.
Course Topics	The module is divided into two sub-modules, 1. "Sustainable cultivation methods", taught by Prof. Damiano Zanotelli, which will cover the following topics: An overview of challenges and opportunities in the agri-food sector, with a focus on mountain agriculture; Efficient management of resources (soil, water, light interception,

	and mineral nutrition of crops) and plant–environment interactions (climate, weather events, and meteorological variables); Cultivation methods (conventional, integrated, and organic) and the principles of agroecology; 2. "Quality of products for food processing", taught by Dr. Dolores Asensio, which will cover the following topics: Classification of agricultural products and quality aspects in the production, post-harvest, and processing phases; In-depth analysis of cereals, grain legumes, tuber crops, oilseeds, fruits, and vegetables, with a focus on high-quality production.
Teaching Format	Frontal lectures, field excursions, laboratory activity, interaction with local stakeholders, group projects
Required Readings	Teaching material provided in the dedicated Teams platform.
Supplementary Readings	These additional book is recommended: Francisco J. Villalobos, Elias Fereres, “Principles of Agronomy for Sustainable Agriculture”, Springer, 2016.