Syllabus

Course Description

Course Title	Plant Genetics
Course Code	40459
Course Title Additional	
Scientific-Disciplinary Sector	AGRI-06/A
Language	German
Degree Course	Bachelor in Food and Enogastronomy Sciences
Other Degree Courses (Loaned)	
Lecturers	dr. Simon Josef Unterholzner, SimonJosef.Unterholzner@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/41647
Teaching Assistant	Dott. Agla Conti
Semester	First semester
Course Year/s	2nd
CP	3
Teaching Hours	18
Lab Hours	12
Individual Study Hours	45
Planned Office Hours	9
Contents Summary	The course gives insights into classic and molecular plant genetics as well as into biotechnological approaches used in modern plant breeding. In detail, the course starts with an introduction into classical mendelian genetics and thereafter explains the molecular mechanisms controlling heredity in plants. Next the course provides an introduction into molecular biotechnology with a focus on genome editing in plants. The content will be explained using examples from crop plants.
Course Topics	• Introduction to plant genetics • Mendel's laws of inheritance

	• Molecular basis of inheritance • Application of biotechnological methods to plants
Keywords	Fundamentals of Plant Genetics Plant Biotechnology Genome Editing in Plants
Recommended Prerequisites	
Propaedeutic Courses	None
Teaching Format	The course combines lectures and laboratory exercises. The laboratory activities will be explained by the instructor and/or teaching assistants. PowerPoint presentations will be made available via Microsoft Teams.
Mandatory Attendance	No
Specific Educational Objectives and Learning Outcomes	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. Students will be able to practically apply the knowledge they have acquired, developing the ability to solve complex problems in the food and gastronomic sector. Thanks to a wide range of practical activities, such as laboratories, internships, workshops, and seminars, they will be able to use chemical, physical, sensory, and

	microbiological analysis methods to evaluate the quality and safety of food and production processes. Graduates of the first profile will be able to manage food processing and preservation processes, design new technological solutions, and apply knowledge of plant genetics and process planning to ensure the quality of the final product. Graduates of the second profile will have advanced skills in managing restaurant businesses, promoting gastronomic heritage, and applying fermentation techniques and food design. In both paths, the ability to enhance by-products and reduce waste will be central, contributing to the sustainable innovation of the sector. 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. 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. Apply ethical and sustainable approaches, reconciling economic

	needs with environmental and social requirements. Graduates will be able to identify solutions to reduce waste, enhance by-products, and optimize resource use, proposing food production models in line with the principles of the circular economy. Express independent judgments regarding innovative techniques for the transformation and enhancement of food and gastronomic productions, evaluating the risks and opportunities associated with the introduction of new technologies or business models, both locally and internationally. Interpret and manage complex data collected through chemical, physical, microbiological, and sensory analyses, in order to improve the quality of food products and effectively respond to food safety needs and regulatory requirements of the sector. "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." 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.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Oral exam
Evaluation Criteria	Awarding a single final grade. Criteria for awarding the grade: the clarity of the answer, the appropriate use of the terminology, the ability to summarise, the argumentative pertinence, the autonomy of judgement and the ability to re-elaborate are assessed.
Required Readings	Copy of the slides presented by the lecturers.
Supplementary Readings	Book: Genetik. Graw, Jochen; SpringerLink (2020)
Further Information	
Sustainable Development Goals (SDGs)	Zero hunger, Life on land, Climate action