Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Grundoperationen der Lebensmittelverarbeitung
Code der Lehrveranstaltung	40465
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	AGRI-07/A
Sprache	Italienisch
Studiengang	Bachelor in Lebensmittelwissenschaften, Önologie und Gastronomie
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Prof. Giovanna Ferrentino, Giovanna.Ferrentino@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/36045
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Zweites Semester
Studienjahr/e	2
KP	6
Vorlesungsstunden	36
Laboratoriumsstunden	24
Stunden für individuelles Studium	90
Vorgesehene Sprechzeiten	18
Inhaltsangabe	The course aims to provide concepts related to the phenomenological understanding of the main unit operations in the food industry. It focuses on describing the operating principles of equipment used in food processing. Analyzing the functioning of these units provides the foundational background for understanding food processes and their impact on

	product quality. The course has the following learning objectives: • identify the unit operations of a food processing • understand the main process parameters • analyze the process, describe the governing variables, write and solve mass and energy balances, and predict food modifications.
Themen der Lehrveranstaltung	Introduction to the study of food processing - General definitions - Physical quantities - Nutritional labeling - Flowcharts Definition of food processes - Mass balances - Energy balances - Mass and energy balances applied to food processes Thermal treatments - Pasteurization - Sterilization - Evaporation - Blanching - Cooking Drying technologies - The activity of water - Phenomena involved in drying - Classification of the types of drying - Description of the different applications
Stichwörter	Nutritional content; Food Technologies; Mass and Energy balances
Empfohlene Voraussetzungen	Knowledge of physic and mathematic concepts.
Propädeutische Lehrveranstaltungen	
Unterrichtsform	The teaching format includes lectures, exercises and laboratory activities. The teaching activities will be in person. Lectures will be recorded and shared with the students.
Anwesenheitspflicht	No
Spezifische Bildungsziele und erwartete Lernergebnisse	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: 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. 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. 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. 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.
Spezifisches Bildungsziel	

und erwartete Lernergebnisse (zusätzliche Informationen)	
Art der Prüfung	Oral exam and reports on laboratory activities.
Bewertungskriterien	Successful completion of the exam will lead to grades ranging from 18 to 30 with honors. During the exam, the following aspects will be considered: clarity of answers, mastery of language (also with respect to teaching language), ability to summarize, evaluate, and establish relationships between topics, critical thinking.
Pflichtliteratur	• 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.
Weiterführende Literatur	
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Nachhaltiger Konsum und Produktion, Industrie, Innovation und Infrastruktur