Syllabus

Course Description

Course Title	Food Technology
Course Code	40205
Course Title Additional	
Scientific-Disciplinary Sector	
Language	German; Italian
Degree Course	Bachelor in Agricultural, Food and Mountain Environmental Sciences
Other Degree Courses (Loaned)	
Lecturers	Prof. Giovanna Ferrentino, Giovanna.Ferrentino@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/36045 Prof. Dr. Andreas Georg Gronauer, Andreas.Gronauer@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/37756
Teaching Assistant	
Semester	Second semester
Course Year/s	3
CP	12
Teaching Hours	72
Lab Hours	48
Individual Study Hours	180
Planned Office Hours	36
Contents Summary	This course belongs to the characterizing subjects of the study program in Food Technology of the Bachelor's degree in Agricultural, Food and Mountain Environmental Sciences. The "Unit Operations in Food Processes" module aims at providing concepts related to the phenomenological understanding of the

	main unit operations of the food industry. It is mainly focused on: 1) definition and construction of a table of food nutrients; 2) description of technologies applied for preserving food products (pasteurization, sterilization, blenching, cooking, evaporation); 3) description of technologies for homogenization and emulsification (mechanical stirring, ultrasounds, high pressure homogenization); 4) description of extraction technologies (maceration, percolation; ultrasounds; microwaves; Soxhlet). The analysis of the unit operation provides the basic background to understand food processes and their impact on the product quality. The "Machines, Plants and Logistics of the Agro-food Industry" module will provide the necessary knowledge to approach in the best way, therefore in a scientific and effective manner, any problem that may arise when there is the need to choose or analyse the operation of machines belonging to an agro-food plant, or to optimize its overall performance or layout. The aim of the module is therefore to provide the students with an essential but complete overview (physical operating principles and technical implementing solutions) on the machines, the components and therefore on the plants that are typically used in the companies for transforming, handling, storing, sanifying agro-food products, focussing on both technical and functional features. The concepts will be supported by application examples and some exercise sessions.
Course Topics	For the module of Unit Operations in Food Engineering: 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 - blanching - 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 For the module of Machines, Plants and Logistics of the Agro-food Industry: Part 1: Introduction and Basic Concepts Part 2: Technological Foundations of Primary Production in Agriculture Part 3: Mechanical Transport and Storage Facilities Part 4: Technical Processing Equipment (Machines and Devices) Part 5: Examples of Post-Harvest Technologies and Exercises
Keywords	Nutritional content; Food Technologies; Mass and Energy balances; Technical Processing Equipment.
Recommended Prerequisites	Knowledge of physic and mathematic concepts.
Propaedeutic Courses	no
Teaching Format	The teaching format includes lectures, exercises and laboratory activities. The teaching will be in person. Lectures will be recorded and shared with the students.
Mandatory Attendance	no
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding (1) of the main unit operations applied in the food industry, (2) of the basic physical principles, technical and functional characteristics of the machines and the equipment that compose a

	plant, (3) of the different technical solutions that can be used for the measurement, control and automation of a plant, the transport of products in solid or liquid phase, for the generation of cold or heat, the distribution and use of energy. Applying knowledge and understanding through the development of some skills concerning: (1) the capability to apply the theoretical knowledge of the course to practical problems, (2) the implementation/choice of the most suitable plant/machine/equipment to satisfy a technical-productive need or to perform a specific task, (3) the critical analysis and the eventual optimization of existing technical solutions, (4) the effective use of calculation tools (e.g., spreadsheet) to solve scientific problems and to process and present data in a graphical format (e.g., with Cartesian graphs), (5) the ability to obtain information from classwork-exercises on how integrating together the theoretical elements provided during the lessons. Making judgements concerning: (1) the applicability of the unit operations by highlighting the advantages and disadvantages deriving from their use, (2) the adequacy of a plant layout or of a machine to perform a task. Communication skills to present the learned concepts (individual unit operations and their relation to food quality and safety, issues and problems related to industrial plant and machinery) with a personal vocabulary that is precise, appropriate and pertinent to the subject (i.e., with an appropriate technical-scientific terminology). Learning skills of increasing the personal knowledge acquired during the course (mass and energy balances applied to unit operations, interactions between production process and product quality, machinery that can be used to carry out a given unit operation) by

	reading technical documents and scientific articles and/or attending specific courses.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	For the module of Unit Operations in Food Engineering: - Oral exam and reports on laboratory activities For the module of Machines, Plants and Logistics of the Agro-food Industry: - Written exam
Evaluation Criteria	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.
Required Readings	For the module of Unit Operations in Food Engineering: • 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. For the module of Machines, Plants and Logistics of the Agro-food Industry: • Keynotes and scientific papers provided by the lecturers
Supplementary Readings	
Further Information	
Sustainable Development Goals (SDGs)	Industry, innovation and infrastructure

Course Module

Course Constituent Title	Unit Operations in Food Engineering

Course Code	40205A
Scientific-Disciplinary Sector	AGRI-07/A
Language	Italian
Lecturers	Prof. Giovanna Ferrentino, Giovanna.Ferrentino@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/36045
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	Introduction to the study of food processing Definition of food processes Thermal treatments Separation technologies Drying technologies
Course Topics	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 - blanching

	- 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
Teaching Format	The teaching format includes lectures, exercises and laboratory activities. The teaching will be in person. Lectures will be recorded and shared with the students.
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	None

Course Module

Course Constituent Title	Machines, plants and logistists of the agro-food industry
Course Code	40205B
Scientific-Disciplinary Sector	AGRI-04/B
Language	German
Lecturers	Prof. Dr. Andreas Georg Gronauer, Andreas.Gronauer@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/37756
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	Part 1: Introduction and Basic Concepts Part 2: Technological Foundations of Primary Production in Agriculture Part 3: Mechanical Transport and Storage Facilities Part 4: Technical Processing Equipment (Machines and Devices) Part 5: Examples of Post-Harvest Technologies and Exercises
Course Topics	
Teaching Format	Lecture and Exercises; in person
Required Readings	noone
Supplementary Readings	