

[6651] - ADVANCED TECHNOLOGIES

Module of [\[6649\] - FOOD TECHNOLOGY II](#)

General information

Course	FOOD SCIENCE AND TECHNOLOGY
Course type	Master's Degree
Academic year	2025/2026
Year	2
Training activity type	Compulsory subjects, characteristic of the class
Scope	Food Technologies
Language	INGLESE
CFU	5 CFU
Didactic Activity Type	Lezione
Exam type	Oral exam
Evaluation	Voto Finale
Teaching period	Annuale (from 23/09/2025 to 29/05/2026)
Teaching type	Obbligatorio
Holders	NERI LILIA - Main teacher
Length	40 hours (40 hours Lezione)
Frequency	Not mandatory
Subject area	AGR/15
Location	TERAMO

Module's Goals

General Aim of the Course

The course aims to provide students with an in-depth understanding of the main non-thermal innovative technologies applicable to the food industry. Particular attention is devoted to the operating principles, process parameters, equipment, and the effects of these technologies on the microbiological, enzymatic, chemical, physical, and nutritional characteristics of foods. Students will acquire interdisciplinary skills useful for evaluating the impact of innovative technologies on the quality, safety, and sustainability of food products, thus building the scientific and technical foundations to become professionals capable of contributing to process innovation and to the development of safe, efficient, and sustainable food supply chains.

Knowledge and understanding

At the end of the course, students will be able to describe and explain the purpose and role of innovative food technologies (non-thermal) in the development of sustainable, safe, and innovative food products; the fundamental principles, process parameters, and equipment requirements of technologies such as high hydrostatic pressure, ultrasound, pulsed electric fields, cold plasma, and vacuum impregnation; the effects of these technologies on the microbiological, enzymatic, chemical, physical, and nutritional characteristics of foods; and the technological and functional modifications of hydrocolloids, proteins, fats, and oils.

Applying knowledge and understanding

Students will be able to:

- identify and evaluate real applications of innovative technologies in food production processes, with particular attention to food safety, the maintenance or improvement of nutritional and sensory properties, environmental sustainability, and compliance with current regulations. They will also be able to integrate multidisciplinary knowledge (chemistry, microbiology, engineering, food science) to identify effective technological solutions.

Making judgements

Students will be able to critically assess:

-the advantages and disadvantages of different innovative technologies applied to various contexts and matrices (plant-based foods, animal-based foods, industrial or artisanal processes);
-technological solutions that balance innovation, safety, and sustainability.

Communication skills

Students will be able to present and compare traditional and innovative technologies, clearly and scientifically illustrating their effects on food properties in both specialist and non-specialist contexts, using appropriate technical terminology supported by data and scientific references.

Learning skills

Students will develop the ability to independently update and expand their knowledge on emerging technological frontiers in the food sector, and to address real-world challenges with a critical approach oriented towards applied research, innovation, and multidisciplinary integration. These skills are consistent with the learning objectives of the Degree Programme, which aims to train professionals capable of operating in highly technological contexts with a strong focus on food quality, safety, and sustainability.

Module's Required skills

To successfully follow the course, students are required to have basic knowledge of:

-Food technology operations and processes, in order to understand the advanced applications of innovative techniques;
-Food microbiology, to interpret the effectiveness of technologies in terms of product safety and microbial stability;
-Food biochemistry, to analyze the effects of technologies on the main food components and their functional properties.

Module's Subjects

Definition and purpose of innovative non-thermal technologies.

High hydrostatic pressure, ultrasound, pulsed electric fields, cold plasma, vacuum impregnation: history; basic principles; main process parameters; equipment; effects on foods (from the microbiological, enzymatic, chemical, physical, and nutritional point of view); effects on the chemical, physical, and technological properties of hydrocolloids, proteins, fats, and oils; applications in the food sector.

Module's Books

Teaching materials:

PDF presentations provided by the lecturer.

Reviews and scientific articles provided by the lecturer.

Additional information:

At the beginning of the course, the lecturer will collect students' contact details in order to create a mailing list for sharing announcements, course-related information, and teaching materials. For non-attending students, teaching materials can be requested by email (lneri@unite.it). Teaching materials will also be uploaded by the lecturer on the institutional virtual platform (UNITE e-learning/Google Drive).

Further teacher–student communication and tutoring activities will be carried out via email and during office hours (every Friday at 10:00), by appointment requested at least five days in advance via email (lneri@unite.it).