UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

Consiglio di Interclasse L-26 e LM-70

General information		
Academic subject	***Unit operations of food technology***	
Degree course	Bachelor programme: *Food Science and Technology (L26)*	
Academic Year	*First*	
European Credit Transfer and Accumulation System (ECTS)		6 ECTS
Language	*Italian*	
Academic calendar (starting and ending date)	*March 13th, 2023 – June 16th, 2023*	
Attendance	*No Compulsory*	

Professor/ Lecturer	
Name and Surname	Francesco Caponio
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Telephone	080 5442235
Department and address	*DiSSPA*
Virtual headquarters	*Microsoft Teams*
Tutoring (time and day)	From Monday to Friday 8.30 a.m. – 1.30 p.m. and 2.30 p.m. – 5.30 p.m. previous agreement

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Syllabus	
Learning Objectives	The student will acquire knowledge on the fundamental operations carried out in the agro-food industries to allow their correct application. An adequate knowledge of the main unitary operations of food technologies, as well as of the principles and laws, is essential to better understand the problems relating to food processing and storage.
Course prerequisites	Knowledge of the principles of mathematic and physic
Contents	**Classification and aims of unit operations. The raw materials and preliminary operations.** *Cleaning, sorting, grading, size reduction.* **Mixing, emulsion and forming.** *Theory of solid and liquid mixing; food emulsions.* **Separation and concentration of food components.** *Milling, filtration, inverse osmosis, ultrafiltration, centrifugation, distillation, solvent extraction.* **Heat transfer in food processing. Processing by application of heat.** *Pasteurisation, sterilisation, evaporation, dehydration, blanching, cooking, frying, thawing.* **Use of low temperature.** *Freeze-drying, refrigeration, freezing.*
Books and bibliography	• Notes of the lectures distributed during the course. • R.P. Singh, D.R. Heldman. Principi di tecnologia alimentare. Casa Editrice Ambrosiana • C. Pompei. Operazioni unitarie della tecnologia alimentare. Casa Editrice Ambrosiana • C. Lerici, G. Lercker. Principi di tecnologie alimentari. Clueb, Bologna • C. Peri. Le operazioni fondamentali della tecnologia alimentare. Cusl, Milano • C. Peri. La filtrazione nelle industrie alimentari. Edizioni Aeb, Brescia • P. Cappelli, V. Vannucchi. Chimica degli alimenti. Conservazione e trasformazioni. Zanichelli, Bologna Additional readings:

	• R.P. Singh, D.R. Heldman. Introduction to food engineering, 3rd edition. Academic Press • Fellows. Food Processing technology, 2nd edition. Woodhead Publishing limited
Additional materials	Notes, slides and other bibliographic materials will be furnished during the course

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/Self-study hours
Hours			
150	*40*	*14*	*96*
ECTS			
6	*5*	*1*	

Teaching strategy	Lectures will be presented by means of Power Point presentations, videos with views of real industrial plants, didactic visit, case-studies and laboratory exercitations. Lecture notes and educational supplies will be provided by means of online platforms.
Expected learning outcomes	
Knowledge and understanding on:	○ Knowledge of the main unit operations and processing technologies in food industry. ○ Knowledge of the couple processing-quality.
Applying knowledge and understanding on:	○ Ability to understand structure-function relationships in food systems and their changes during processing. ○ Ability to apply correct processing conditions to ensure food quality and safety. ○ Ability to apply theory and laws underlying unit operations to better address processing issues.
Soft skills	• *Making informed judgments and choices* ○ Ability to correctly direct choices and solutions in food processing to ensure high quality standards. ○ Ability to evaluate individual unit operations as regards energy consumption and cost minimization. • *Communicating knowledge and understanding* ○ Ability to correctly describe unit operations and their relationships with food quality and safety. • *Capacities to continue learning* ○ Ability to deepen and update knowledge of processing-quality interactions.
The expected learning outcomes, in terms of both knowledge and skills, are provided in Annex A of the Academic Regulations of the Degree in Food Science and Technology (expressed through the European Descriptors of the qualification).	

Assessment and feedback	
Methods of assessment	The exam consists of an oral dissertation on the topics developed during the theoretical and theoretical-practical lectures in the classroom and in the laboratory/production plants, as reported in the Academic Regulations for the Bachelor Degree in Food Science and Technology (article 9) and in the study plan (Annex A).

	Students attending at the lectures may have a middle-term preliminary exam, consisting of a written test, relative to the first part of the program, which will concur to the final evaluation and will be considered valid for a year. Non-Italian students may be examined in English language, according to the aforesaid procedures.

Evaluation criteria	• *Knowledge and understanding*
	  ○ Describing unit operations in food industry and processing-quality interactions.
	• *Applying knowledge and understanding*
	  ○ Describing theory and laws underlying unit operations and changes involving food constituents.
	• *Autonomy of judgment*
	  ○ The student should be able to formulate reasonable hypotheses on the influence of different technologies on food quality
	• *Communicating knowledge and understanding*
	  ○ Describing the relationships of unit operations with food quality and safety.
	• *Communication skills*
	  ○ The student will be evaluated considering the use of appropriate technical language.
	• *Capacities to continue learning*
	  ○ Hypothesizing processing solutions to minimize the impact of processing on food quality.

Criteria for assessment and attribution of the final mark	The evaluation of the preparation of the student occurs on the basis of established criteria, as detailed in Annex B of the Academic Regulations for the Bachelor Degree in Food Science and Technology.
Additional information	