

General Information	
Academic subject	Unit operations of food technology
Degree course	Bachelor programme: Food Science and Technology
ECTS credits	6 ECTS
Compulsory attendance	No
Teaching language	Italian

Subject teacher	Name Surname	Mail address	SSD
	Francesco Caponio	francesco.caponio@uniba.it	AGR/15

ECTS credits details		
Basic teaching activities	5 ECTS Lectures	1 ECTS Laboratory or field classes

Class schedule	
Period	I semester
Course year	Second
Type of class	Lectures Laboratory or field classes Video Didactic visit

Time management	
Hours	150
In-class study hours	54
Out-of-class study hours	96

Academic calendar	
Class begins	October 1 st , 2018
Class ends	January 14 th , 2019

Syllabus	
Prerequisites/requirements	Knowledge of the principles of mathematic and physic
Expected learning outcomes	<p><i>Knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ Knowledge of the main unit operations and processing technologies in food industry ○ Knowledge of the couple processing-quality <p><i>Applying knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ 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 <p><i>Making informed judgements and choices</i></p> <ul style="list-style-type: none"> ○ 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 <p><i>Communicating knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ Ability to correctly describe unit operations and their relationships with food quality and safety <p><i>Capacities to continue learning</i></p> <ul style="list-style-type: none"> ○ Ability to deepen and update knowledge of processing-quality interactions <p>The expected learning outcomes, in terms of both knowledge and</p>

	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)
Contents	<p>Classification and aims of unit operations. The raw materials and preliminary operations. <i>Cleaning, sorting, grading, size reduction.</i></p> <p>Mixing, emulsion and forming. <i>Theory of solid and liquid mixing; food emulsions.</i></p> <p>Separation and concentration of food components. <i>Milling, filtration, inverse osmosis, ultrafiltration, centrifugation, distillation, solvent extraction.</i></p> <p>Heat transfer in food processing. Processing by application of heat. <i>Pasteurisation, sterilisation, evaporation, dehydration, blanching, cooking, frying, thawing.</i></p> <p>Use of low temperature. <i>Freeze-drying, refrigeration, freezing.</i></p>
Course program	
Reference books	<ul style="list-style-type: none"> • 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 <p>Additional readings:</p> <ul style="list-style-type: none"> • R.P. Singh, D.R. Heldman. Introduction to food engineering, 3rd edition. Academic Press • Fellows. Food Processing technology, 2nd edition. Woodhead Publishing limited
Notes	
Teaching methods	<p>Lectures will be presented by means of Power Point presentations, videos with views of real industrial plants, didactic visit, case-studies and laboratory exercitations.</p> <p>Lecture notes and educational supplies will be provided by means of online platforms (i.e.: Edmodo).</p>
Evaluation methods	<p>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).</p> <p>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.</p> <p>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.</p> <p>Non-Italian students may be examined in English language, according to the aforesaid procedures</p>

Evaluation criteria	<p><i>Knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ Describing unit operations in food industry and processing-quality interactions <p><i>Applying knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ Describing theory and laws underlying unit operations and changes involving food constituents <p><i>Making informed judgements and choices</i></p> <ul style="list-style-type: none"> ○ Expressing reasonable hypotheses regarding choices and solutions in food processing to ensure high quality standards <p><i>Communicating knowledge and understanding</i></p> <ul style="list-style-type: none"> ○ Describing the relationships of unit operations with food quality and safety <p><i>Capacities to continue learning</i></p> <ul style="list-style-type: none"> ○ Hypothesizing processing solutions to minimize the impact of processing on food quality
Receiving times	From Monday to Friday 8.30 a.m. – 1.30 p.m. and 2.30 p.m. – 5.30 p.m. previous agreement.