General Information	
Academic subject	Multiphasic systems and food chemistry (I.C. Foods and applied nutrition)
Degree course	Food Science and Technology (LM70)
ECTS credits	3 ECTS
Compulsory attendance	No
Teaching language	Italian

Subject teacher	Name Surname	Mail address	SSD
	Graziana Difonzo	graziana.difonzo@uniba.it	AGR/15

ECTS credits details		
Basic teaching activities	2 ECTS Lectures	1 ECTS Laboratory or field classes

Class schedule	
Period	First semester
Course year	First
Type of class	Lectures and workshops

Time management	
Hours	75
In-class study hours	30
Out-of-class study hours	45

Academic calendar	
Class begins	September 27th, 2021
Class ends	January 21st, 2022

Syllabus	
Prerequisites/requirements	Knowledge of general, inorganic and organic chemistry. Knowledge of food constituents. Knowledge of the main food technologies
Expected learning outcomes	*Knowledge and understanding* o knowledge about the main chemical and physical interactions of food constituents as well as the chemical transformations that the main components of food undergo during processing and storage. *Applying knowledge and understanding* o knowledge of the qualitative characteristics of the by-products deriving from the productive processes object of the teaching o *Ability to apply a systemic approach to the assessment of food composition and characteristics* o *Ability to trace the phenomena and constituents that determine the characteristics and quality of food and its evolution over time* o *Ability to describe chemical characteristics and structural organisation of innovative food systems* *Making informed judgements and choices* o Ability to describe the constituents and chemical phenomena underlying the macroscopic characteristics and phenomena affecting food *Communicating knowledge and understanding* o Ability to describe possible technologies to exploit waste and by-products *Capacities to continue learning*

	o Ability to deepen and update their knowledge of chemical and physical interactions of food constituents. 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)
Contents	Carbohydrates. Minor mono- and disaccharides. Oligosaccharides of food interest. Alditoli. Gelatinization and retrogradation of starch. Hydrolysis and destrinization. Cyclodextrins. Modified starches and resistant starch. Pectins, alginates, carragenans, gums. Gelification. Thermal degradation/caramelization. Hemicelluloses, -glucans, fruity. Reactions of Maillard, Acrylamide, Ages. 1 6 3,5 Lipids. Emulsions: formation, rupture, stabilization. Emulsifiers. Some food emulsions: mayonnaise, ice cream. Crystallization. Modifications of triglycerides. Protids. Conformation changes. Denaturation. Oxidation. Proteolysis. Oligopeptids of interest. Reactions with fat oxidation products. Emulsions, gels and foams. Collagen and gelatin. Coagulation. Gluten reticulum. Antioxidants and their mechanisms of action in relation to food preservation.
Course program	
Reference books	Notes from lectures and laboratory classes. Presentations (in pdf) provided by the teacher. • Coultate T. P., La Chimica degli Alimenti. Zanichelli (Bologna), 2004. • Fennema, O. R. (2010). Dispersed systems. In: Food Chemistry. Marcel Dekker. • Reviews scientifiche da letteratura di settore Per approfondimenti: • Belitz, H.-D., Grosch, W., & Schieberle, P. (2009). Food chemistry. Springer. • Wong D. W. S., Mechanism and Theory in Food Chemistry. Springer, 1989. • Cappelli P., Vannucchi V., Chimica degli alimenti. Conservazione e trasformazioni. Zanichelli (Bologna), 1994 • Cabras P., Martelli A., Chimica degli alimenti, Piccin (Padova), 2004.
Notes	
Teaching methods	Lectures will be presented through PC assisted tools (PowerPoint, video). Field and laboratory classes, reading of regulations will be experienced. Lecture notes and educational supplies will be provided by means of online platforms (i.e.: Edmodo, Google Drive…)
Evaluation methods	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. 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's degree in food science and Technology. The foreign student's profit test can be done in English in the way described above

Evaluation criteria	Knowledge and understanding
	  o Describe the main chemical and physical interactions of food constituents
	Applying knowledge and understanding
	  o Describe the phenomena and constituents that determine the characteristics and quality of food products and their evolution over time
	Making informed judgements and choices
	  o Express reasonable assumptions to change the characteristics and quality of food presented as case studies
	Communicating knowledge and understanding
	  o Describe the constituents and chemical phenomena underlying the macroscopic characteristics and phenomena affecting foods presented as case studies
	Capacities to continue learning
	  o Envisaging a possible approach for the chemical features evaluation

Receiving times	The teacher is available from Monday to Friday (8:00 am – 6:00 pm) only by appointment