ACADEMIC YEAR 2023/2024

General information	
Academic subject	**FOOD CHEMISTRY** (integrated exam of CHEMICAL AND PHYSICAL EVALUATION OF FOOD PRODUCTS)
Degree course	Foods of animal origin safety and health - (LM86)
Academic Year	2023/2024 – I year
European Credit Transfer and Accumulation System (ECTS)	6
Language	Italian
Academic calendar (starting and ending date)	I semester
Attendance	strongly recommended

Professor/ Lecturer	
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Department and address	Campus of Veterinary Medicine, S.P. 62 to Casamassima km 3, 70010 Valenzano (Ba)
Virtual headquarters	Microsoft Teams, code: raak0n8
Tutoring (time and day)	Every day from Monday to Friday by appointment via e-mail

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Syllabus	
Learning Objectives	The course provides notions on the chemical-physical composition and production technologies of the main foods as well as the related analytical control to ensure their safety and quality, also in terms of verification of the marks of origin.
Course prerequisites	The student must have basic notions of General and Inorganic Chemistry, of Organic Chemistry
Contents	

Knowledge	Topics	Description	Hours
	Introduction to the course	Educational objectives of the course, effects on professionalism, teaching methodologies, methods of verification of learning	2
Acquisition of knowledge relating to the food classification	Definition and objectives of Food Chemistry	Food quality, Food contaminants, Food adulteration, Tasks of Food Chemistry	2
Knowledge of macronutrients	Carbohydrates: Classification, use, biological importance, presence in food	Chemical structure, chemical and physical characteristics that determine the biological activity	2

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		Lipids: Classification, use, biological importance, presence in food	Chemical structure, chemical and physical characteristics that determine the biological activity	2
		Proteins: Classification, use, biological importance, presence in food	Chemical structure, chemical and physical characteristics that determine the biological activity	2
	Knowledge of micronutrients	Fat-soluble and water-soluble vitamins and mineral salts	Chemical structure and biological activity	2
	Knowledge of methods of food preservation	Food processing and storage	Storage with cold, with heat, by dehydration, by irradiation.	2
	Knowledge of analytical methods	Basic principles of analytical techniques applied to food analysis	Sample pretreatment methods; Chromatographic methods; Atomic and Molecular spectroscopy; Mass Spectrometry; Nuclear Magnetic Resonance Spectroscopy, Isotopic methods.	8
	Knowledge of composition, production techniques and controls on the main foods	Milk and derivatives; Meat, fish and derivatives; Water; Eggs; Fruits and Vegetables; Coffee; Honey;Wine; Olive oil; Cereals	Definition and composition of the foods of interest and the main derived products; chemical-physical analysis	20
	Knowledge of innovative approaches for solving agri-food problems	Multivariate models to verify the quality and/or safety of food	Basic principles of chemometric and application of multivariate models in studies reported in the literature	6

Books and bibliography

Chimica degli alimenti:

P. Cabras, A. Martelli (a cura di): Chimica degli alimenti, Piccin, Padova, 2004.
T. P. Coultate: La chimica degli alimenti, Zanichelli, Bologna, 2005.
H.-D. Belitz, W. Grosch: Food Chemistry, Springer, Berlin, 1999.
L. Debellis, A. Poli (a cura di): Alimentazione, nutrizione e salute, Edises, Napoli, 2019.

Chimica analitica e problematiche analitiche degli alimenti:

R. S. Singhal, P. R. Kulkarni, D. V. Rege: Handbook of Indices of Food Quality and Authenticity, Woodhead Publishing Ltd., Cambridge, 1997
H. Egan, R. S. Kirk, R. Sawyer: Pearson's Chemical Analysis of Foods, 8th Ed., Churchill Livingstone, Edinburgh, 1981
F. Tateo: Analisi dei prodotti alimentari, Chiriotti, Pinerolo, 1978

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	Any general text of analytical and organic chemistry
Additional materials	Handouts in pdf format provided in class, scientific articles

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
150	***48***		***102***
ETCS			
6	***6***		

Teaching strategy	
	Frontal teaching (blended learning)
Expected learning outcomes	
Knowledge and understanding on:	The teaching approach allows the student to obtain knowledge at a specialist level relating to the complexity of food chemistry, responding to the problems that characterize it. In particular, the teaching allows you to acquire adequate knowledge both in general and for specific foods concerning ○ Notions on quality and safety and food ○ the chemical-physical characteristics of food ○ methods of preserving food ○ production methods ○ chemical-physical analyses
Applying knowledge and understanding on:	The acquisition of the ability to apply knowledge and understanding will be verified through discussions in the classroom, or during the exam, on problems in the sector, where the student will be asked to formulate solution hypotheses, highlighting his ability to apply the concepts learned in maximum autonomy, with reference to the following topics: ○ ability to conduct chemical-physical investigations on food, interpret its results and optimize them by appropriately modifying production technologies; ○ ability to develop production, storage, treatment technologies, able to safeguard food components; ○ ability to identify foods with greater health potential.
Soft skills	• *Autonomy of judgment* With the help of the teacher, the student will have to develop an adequate autonomy of judgment through a constant comparison with the existing problems in the food chemistry sector, proposing personal interpretations and demonstrating good practical skills in solving these problems. Verification of the acquisition of independent judgment will be based both on the exams and during the course • *Communicating knowledge and understanding* Verification of the acquisition of this competence will be assessed at the end of each teaching module as well as during the course of teaching, where students, under the guidance of teachers, will be able to hold seminars on agreed topics (discussion on scientific articles)

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	• *Capacities to continue learning* The student will have to acquire the ability to study independently and to acquire information by consulting both books and magazines in the sector, and the most recent IT tools. To best develop this ability, during the courses, in-depth activities will be assigned to some issues for which the student will have to demonstrate the ability to develop the state of the art, starting from multiple sources. Learning ability will be assessed through informal tests during the course

Assessment and feedback	
Methods of assessment	The exam consists of an oral test on the topics covered in the course and on the discussion on a scientific article concerning agri-food issues.

Evaluation criteria	• *Knowledge and understanding:*
	  ○ completeness of the knowledge acquired both in general and for specific foods, regarding their characterization, quality and safety
	• *Applied knowledge and understanding:*
	  ○ ability of the student to apply the concepts learned in maximum autonomy
	• *Autonomy of judgment*
	  ○ critical reasoning skills on the study carried out
	• *Communicating knowledge and understanding*
	  ○ competence in the use of the specialized vocabulary
	  ○ clarity of exposure.
	• *Capacities to continue learning*
	  ○ any personal in-depth study of the topics covered

Criteria for assessment and attribution of the final mark	The final grade is awarded out of thirty. The exam is passed when the grade is greater than or equal to 18. To achieve a high evaluation, the student must have developed autonomy of judgment and adequate capacity for argumentation and presentation.
Additional information	

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