

COURSE OF STUDY *Bachelor's degree: Food Science and Technology (L-26)*
ACADEMIC YEAR *2023-2024*
ACADEMIC SUBJECT *Analyses for food quality (3 ECTS) - I.C. Food quality and safety (6 ECTS)*

General information	
Year of the course	Third
Academic calendar (starting and ending date)	First semester (September 25 th , 2023 – January 19 th , 2024)
Credits (CFU/ETCS):	3
SSD	Food Science and Technology (AGR/15)
Language	Italian
Mode of attendance	No Compulsory

Professor/ Lecturer	
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Department and address	DIP. DISSPA – Università degli Studi di Bari – Via Amendola 165/a
Virtual room	Microsoft Teams: code <i>uqfohf4</i>
Office Hours (and modalities: e.g., by appointment, on line, etc.)	Monday to Friday by appointment only.

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
75	16	14	45
CFU/ETCS			
3	2	1	

Learning Objectives	The course aims to provide knowledge on sampling methods and sample management in the laboratory, analyses for the determination of the gross composition (moisture, fat, protein, ashes, sugars, fibres) of foods, analyte extraction techniques from food matrices, refractometry and polarimetry.
Course prerequisites	Knowledge of the main food technologies and food chains. Basic knowledge of mathematics, statistics, chemistry, and physics. Knowledge of food chemistry. The exam does not include prerequisites.

Teaching strategies	The topics of the course will be covered with the help of presentations, videos, and other teaching materials useful for completing the learning and acquisition of knowledge. Furthermore, the practical activities in the laboratory will allow the practical execution of some of the methods studied during the course.
Expected learning outcomes in terms of	
Knowledge and understanding on:	<ul style="list-style-type: none"> Knowledge of the main analytical methods for determining the gross composition of foods

	<ul style="list-style-type: none"> • Knowledge of sampling issues and possible strategies to perform it • Knowledge of the main techniques for the extraction of analytes of interest from complex food matrices • Knowledge of calculation procedures for the expression of analytical results
Applying knowledge and understanding on:	<ul style="list-style-type: none"> • Ability to follow and execute analytical protocols for determining the gross composition of foods • Ability to express the analytical result in the required form (e.g., as required by official regulations, etc.) • Ability to follow and execute procedures for extracting analytes from complex matrices
Soft skills	<ul style="list-style-type: none"> • Making informed judgments and choices: <ul style="list-style-type: none"> ○ Ability to interpret analytical results ○ Ability to identify the most suitable analytical procedure and/or combination of analytical procedures for solving real problems encountered in food industries ○ Ability to autonomously evaluate the effectiveness of a given analytical process and identify critical issues • Communicating knowledge and understanding: <ul style="list-style-type: none"> ○ Ability to describe the analytical methods underlying the assessment of the composition and quality of food products ○ Ability to argue about the characteristics of the different analytical methods in relation to specific situations ○ Ability to express the theoretical concepts acquired orally and in writing, using appropriate scientific language • Capacities to continue learning: <ul style="list-style-type: none"> ○ Ability to understand and apply new reference analytical protocols for specific food chains (e.g., international standards) ○ Ability to deepen and update one's knowledge of analytical methods useful for evaluating the composition and quality of food products.
Syllabus	
Content knowledge	<ul style="list-style-type: none"> • Sampling and sample treatment for food analysis. • Analytical methods for evaluating the gross composition of foods: <ul style="list-style-type: none"> - determination of moisture and dry weight - fat determination - determination of proteins - determination of sugars - determination of fibres - determination of ashes • Extraction techniques: <ul style="list-style-type: none"> - liquid-liquid - solid-liquid - SPE and dSPE - SPME • Refractometry • Polarimetry
Texts and readings	<ul style="list-style-type: none"> • Cabras P., Tuberoso C.I.G. Analysis of Food Products. Piccin editions 2010. • Moret S., Purcaro G., Conte L.S. The champion for chemical analysis – innovative techniques and applications in the agri-food and environmental sectors. Springer editions, 2014. • Lecture notes and teaching material distributed during the course.
Notes, additional materials	<ul style="list-style-type: none"> • Scientific papers
Repository	All teaching material will be available to students on web platforms (class Teams code <i>uqfohf4</i>).

Assessment	
Assessment methods	<p>The exam consists of an oral interview about the topics developed during the frontal teaching hours and the practical laboratory activities. It aims to evaluate the knowledge acquired about the protocols and the salient aspects (advantages and disadvantages, issues) of the chemical and physical analyses used for the evaluation of the composition of foods, as well as the extraction procedures of analytes of interest. Sufficiency is guaranteed by a basic knowledge of the aspects mentioned, associated in any case with an appropriate mastery of the specific technical-scientific language. For students enrolled in the year of the course in which the teaching is carried out, an intermediate evaluation test is foreseen, which consists of a written test with closed and open answers on topics developed by the date of the intermediate evaluation test (art. 4 of the Academic Regulations of the Degree Course in Food Science and Technology). The intermediate exam is evaluated out of thirty and in case of a positive outcome, in the final oral exam the interview will focus on the remaining part of the teaching contents. The outcome of the intermediate test is communicated by publication on the student's electronic register and contributes to the evaluation of the exam by calculating the weighted average and is valid for one academic year.</p> <p>The profit exam for foreign students can be carried out in English according to the methods described above.</p>
Assessment criteria	<ul style="list-style-type: none"> • Knowledge and understanding: <ul style="list-style-type: none"> ○ Clear and critical exposition of the analytical methods for determining the gross composition of foods ○ Clear and critical exposition of the possible sampling strategies in the food chains ○ Clear and critical exposition of the main techniques for extracting analytes of interest from complex food matrices ○ Illustration of the calculation procedures for the expression of the analytical data • Applying knowledge and understanding: <ul style="list-style-type: none"> ○ Presentation of the analytical protocols for determining the gross composition of foods ○ Presentation of the procedures for extracting analytes from complex matrices ○ Presentation of the advantages and disadvantages of the studied analytical and extraction techniques ○ Presentation of the analytical results in the required form (e.g., conversion between different forms of expression of the result) • Autonomy of judgment: <ul style="list-style-type: none"> ○ Critical evaluation of the characteristics of different food products according to the analytical results obtained ○ Critical evaluation of the most suitable analytical procedure among the various available according to the specific purpose ○ Evaluation of the most suitable sampling process functional to the achievement of a specific objective • Communicating knowledge and understanding: <ul style="list-style-type: none"> ○ Describing, also through applicative cases, the practical aspects and potential consequences of this discipline on the research and development and quality control activities in food industry • Communication skills: <ul style="list-style-type: none"> ○ Communicating the theoretical concepts acquired using the appropriate scientific language and lexicon

	<ul style="list-style-type: none"> • Capacities to continue learning: <ul style="list-style-type: none"> ○ Clear and effective presentation of the analytical methods underlying the assessment of the composition and quality of food products ○ Exposition using appropriate and specific language of the subject under study ○ Ability to use examples to describe analytical protocols • Capacities to continue learning: <ul style="list-style-type: none"> ○ Proposal of modifications and/or improvements and/or adaptations of specific analytical procedures for specific contexts ○ Proposal of modifications and/or improvements and/or adaptations of specific sampling procedures for specific contexts
Final exam and grading criteria	<p>The evaluation of the student's preparation takes place based on pre-established criteria in accordance with what is reported in the Academic Regulations of the Degree Course in Food Science and Technology (art. 4).</p> <p>The examination Commission has a score ranging from a minimum of 18 up to a maximum of 30 points for the positive evaluation of the profit. With the unanimity of the members, the Commission can grant honours, in cases where the final mark is equal to 30.</p>
Further information	