Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	Environmental Chemistry towards Food Processing
Course code	44702
Scientific sector	AGR/13
Degree	LM-70
Semester	II
Year	I
Academic year	2024-25
Credits	8
Modular	No

Total lecturing hours	48
Total lab hours	34
Total exercise hours	
Attendance	Strongly recommended
Prerequisites	Basic knowledge of inorganic and organic chemistry, microbiology
Course page	

Specific educational objectives	The course belongs to the area of learning that characterize the Study Course (corsi caratterizzanti) and specifically in the context of the disciplines of Food Sciences. The aim of the course is to provide students with an adequate mastership of general scientific principles and methods as well as some specific professional knowledge. The aim of the course is to acquire the basic knowledge that is necessary to understand possible sources of contamination within the agri-food production chain and how to manage them. In particular, it is expected that the student acquires knowledge on the pollution risk assessment within the agri-food production chain, the main properties and characteristics of chemical and biological contaminants, the chemical and biological analytical techniques exploited to detect them and elements of prevention to avoid such contaminations.

Lecturer	Prof. Youry Pii Office: K0.09 e-mail: youry.pii@unibz.it Phone: +390471017164 https://www.unibz.it/en/faculties/sciencetechnology/academic-staff/person/33704-youry-pii

	Prof. Stefano Cesco Office: K1.01 e-mail: Stefano.cesco@unibz.it Phone: +39047101716 https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/30263-stefano-cesco
Scientific sector of the lecturer	AGR/13
Teaching language	English
Office hours	From Monday to Friday upon appointment
Teaching assistant (if any)	Dott. Roberto Fattorini Dott. Alessandro Agostini
Office hours	24
List of topics covered	Introduction to the Environmental Chemistry and to the Environmental pollutants. Risk assessment of contaminants and residues in foods. Techniques for the detection of contaminants and residues in foods (gas chromatography-mass spectrometry, HPLC-MS, bioassays, electrochemical biosensors, PCR-based methods). Major contaminants in food: organic contaminants (e.g. dioxins, PCBs, PCNs), veterinary drug residues, agrochemicals residues, heat-generated toxicants, heavy metals and metalloids, microplastics, mycotoxins, phycotoxins and plant-derived contaminants. Genetic contamination of food. Case studies about the contamination of different classes of food commodities.
Teaching format	The course consists of lectures (48 hours of frontal lectures) during which the different topics will be presented and discussed. Practical lessons, laboratory activities and didactic trips (34 hours in total), conducted by the Teacher and the Teaching Assistants, are also foreseen. Course topics will be presented using Power Point presentations; all the Power Point presentations will made available to students in advance through the Teams platform.

Learning outcomes	○ *Knowledge and understanding* Students will acquire knowledge about the main environmental pollution sources for food processing within the agricultural production; they will be also provided with knowledge about the pollutants adsorption, translocation and accumulation in plants and food. ○ *Applying knowledge and understanding* Students will be able to understand the movement and the cycle of pollutants within agrifood production chain. ○ *Making judgements*

	The knowledge acquired will allow students to make judgements and to manage the prevention and the control of pollution events within the agrifood production chain. ○ Communication skills Students will acquire the ability to describe environmental issues related to the agrifood chain processes and the technologies. ○ Learning skills Students will acquire the skills and expertise to widen and to update their knowledge about the contents and the topics discussed within the course.

Assessment	Oral (80%) and report about lab experience (20%). The final assessment will consist in an oral exam, which will consist in a) questions to evaluate the knowledge and the understanding of the case study and topics discussed during the classes and b) questions aimed at establishing the ability to apply such knowledge to hypothetical case studies. The ability to rework the experience acquired during laboratory exercises will also be evaluated.
Assessment language	English
Evaluation criteria and criteria for awarding marks	The mark of the oral exam will be awarded based on the following criteria: the clarity of the response, the ability to summarize, evaluate, and establish relationships between topics. The final mark will be calculated by considering the oral (80%) and report about lab experience (20%).

Required readings	○ D. Schrenk "Chemical Contaminants and Residues in Food" Woodhead Publishing ISBN 978-0-85709-058-4. ○ Charles L. Wilson "Microbial food contamination" CRC Press ISBN-13: 978-0-8493-9076-0.
Supplementary readings	○ C. Baird, M. Cann "Environmental Chemistry" W.H. Freeman and Company ISBN-13: 978-1-4292-7704-4