

General Information	MASTER DEGREE IN BIOTECHNOLOGIES
Title of the subject	Environmental Analytical Chemistry
Degree Course (class)	Industrial and Environmental Biotechnology
ECTS credits	6
Compulsory attendance	YES
Language	ITALIAN
Academic year	2020-21

Subject Teacher		
Name and Surname	Elvira De Giglio	
email address	elvira.degiglio@uniba.it	
Place and time of reception	Department of Chemistry, Room 13 MON-WED-FRI 10.00-12.00; TUE-THU 4.30-6.30 pm	
ECTS credits details	Discipline sector (SSD)	Area
	CHIM01	---

Study plan schedule	Year of study plan		Semester	
	I	II		
Time management	Lessons	Laboratory	Exercises	Total
CFU	5	1		6
Total hours	125	25		150
In-class study hours	40	12		52
Out-of-class study hours	85	13		98

Syllabus	
Prerequisites / Requirements	Knowledge of analytical chemistry, organic chemistry and general chemistry.
Expected learning outcomes (according to Dublin descriptors)	
Knowledge and understanding	Students will learn the theoretical and practical basis of the environmental analytical chemistry, with particular reference to the instrumental analytical techniques for the determination of pollutants.
Applying knowledge	The course aims to provide the necessary knowledge to carry out advanced qualitative and quantitative chemical investigations, applied to the environmental field.
Making informed judgments and choices	Students will learn the ability to critically evaluate and independently process experimental data.
Communicating knowledge	Students will develop the ability to write and present experimental results in a clear and concise way.
Capacities to continue learning	Students will learn to identify and use the most appropriate analytical techniques to respond to different environmental questions (eg. Monitoring and sampling of pollutants, determination of pollutants

	species of environmental interest).
Study Program	
Content	<p>Part I. Production technologies and the environment: emission control and waste fate. The chemistry of natural waters: BOD, COD, decomposition of organic matter, CO₂-carbonate, dissolved ions.</p> <p>Part II Heavy metals, toxic organic molecules (dioxins, furans, PCBs, etc.): characteristics, sources and environmental diffusion.</p> <p>Part III Waste, soil and sediments</p> <p>Part IV Environmental chemical analyzes: water and soil sampling methods. Methods for analyzing heavy metals: atomic absorption and emission spectroscopy. Preliminary treatment of samples for the analysis of metals, preconcentration methods for the determination of trace metals, analytical determination of heavy metals (As, Cd, Hg, Pb) Methods of analysis of organic pollutants: chromatographic techniques, mass spectrometry and hyphenate techniques GC-MS, HPLC-MS.</p> <p>Part V Analytical protocols for the determination of heavy metals and organic pollutants in water.</p> <p>Part VI Laboratory experiments related to the analytical determination of pollutants</p>
Bibliography and textbooks	Baird Cann Chimica Ambientale, Zanichelli Skoog West Holler Crouch Chimica Analitica Fondamenti, EdiSES Skoog Leary Chimica Analitica Strumentale, EdiSES
Notes to textbooks	
Teaching methods	Oral lessons with multimedia support, laboratory experiments
Assessment methods (oral, written, ongoing assessment)	ORAL
Evaluation criteria (describe criteria for each of the above expected outcomes)	Students should demonstrate: - skills in identifying and applying the most appropriate analytical techniques, among those examined, to answer various questions of environmental pollution; - skills to operate in the laboratory in compliance with safety standards; - skills to critically evaluate the results of the experimental procedures; - clarity and completeness in the oral presentation of the program contents; skills to link with the content of other courses.
Further information	