



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Scienze della Terra e del Mare
<b>ACADEMIC YEAR</b>	2017/2018
<b>MASTER'S DEGREE (MSC)</b>	MARINE BIOLOGY
<b>SUBJECT</b>	MARINE ENVIRONMENT CHEMISTRY
<b>TYPE OF EDUCATIONAL ACTIVITY</b>	C
<b>AMBIT</b>	20879-Attività formative affini o integrative
<b>CODE</b>	13793
<b>SCIENTIFIC SECTOR(S)</b>	CHIM/12
<b>HEAD PROFESSOR(S)</b>	ORECCHIO SANTINO    Professore Associato    Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>	
<b>CREDITS</b>	6
<b>INDIVIDUAL STUDY (Hrs)</b>	98
<b>COURSE ACTIVITY (Hrs)</b>	52
<b>PROPAEDEUTICAL SUBJECTS</b>	
<b>MUTUALIZATION</b>	
<b>YEAR</b>	2
<b>TERM (SEMESTER)</b>	1° semester
<b>ATTENDANCE</b>	Not mandatory
<b>EVALUATION</b>	Out of 30
<b>TEACHER OFFICE HOURS</b>	<b>ORECCHIO SANTINO</b> Tuesday    08:00    10:00    Studio Prof. Orecchio, Ed. 17, Viale delle Scienze, Palermo

DOCENTE: Prof. SANTINO ORECCHIO

<b>PREREQUISITES</b>	Numerical calculations and stoichiometry
<b>LEARNING OUTCOMES</b>	<p>Knowledge and ability to understand The knowledge and skills of understanding of Marine Environmental Chemistry students will be oriented to the acquisition of theoretical and experimental competences, with particular reference to: marine chemistry, analytical methods of environmental matrices, interpretation and evaluation of data from monitoring. In addition, the student must possess knowledge on integrated processes occurring in the environment and the influence that human activities exert on the different environmental matrices.</p> <p>Applying knowledge and understanding. The student, at the end of the course, will have to possess application competences for the monitoring of various environmental matrices by field and laboratory instruments; In particular, the student, based on specific acquired knowledge, integrated with experiences in the classroom and simulation of laboratory activities, should be able to propose, chemical environmental monitoring plans. In particular, the student must be able to define the major chemical characteristics of a marine environmental matrix, in particular marine water, in terms of composition, reactivity and use.</p> <p>Making judgments The student will develop skills on scientific approach to sampling and monitoring, evaluation and interpretation of experimental data; safety in the laboratory and in the field; In particular, on the basis of knowledge acquired, supplemented by laboratory (or simulations) and field activities, the student must be able to carry out the evaluation of the quality of the environment and to coordinate the environmental monitoring of the main quality parameters. Independent judgment is made through the experience achieved through exercises, the production of processed and reports, etc.</p> <p>Enable communication The student must be able to explain the basic concepts of marine environmental chemistry, integrating them with the concept of the natural cycle (or biogeochemistry) and pollution of the various environmental compartments.</p>
<b>ASSESSMENT METHODS</b>	<p>The final exam is constituted on a the discussion in the classroom of a topic assigned by the teacher during the course and a task class. The task assignment consists of at least 15 questions, some of which a multiple answer, some are required to discuss a topic discussed during the course, some provide to solving a problem. Each question is assigned a value (reported in the text), the sum of which is 30/30. The task class will be evaluated on the sum of the values of the correct questions. To pass the exam you must pass the task assignment at least 18/30. The final vote is constituted from the average of the two trials from the vote of 18/30 given when the knowledge/skills of the subject are at least elementary, until the vote of 30/30 with any praise as well as the knowledge/skills are excellent.</p> <p>In particular, the final evaluation will be: Excellent (30-30 and praise) - Excellent knowledge of subjects, excellent language property, good analytical ability. The student is able to apply the knowledge to solve all the problems proposed. Very Good (26-29) - Good mastery of arguments, full language ownership. The student is able to apply knowledge to solve the proposed problems. Good (24-25) - The student achieves basic knowledge of the main topics, discrete language skills, limited ability to independently apply knowledge to the solution of proposed problems. Satisfactory (21-23) - The student is not fully mastered in the main topics but possesses knowledge, satisfactory language property, poor ability to apply the acquired knowledge independently. Sufficient (18-20) - The student has a minimum basic knowledge of the main topics and technical language, little or no ability to independently apply the acquired knowledge. Insufficient - The student does not have an acceptable knowledge of the contents of the topics covered in the teaching.</p>
<b>EDUCATIONAL OBJECTIVES</b>	<p>The course is aimed to provide the basic concepts for the definition of the chemical composition and characteristics of natural ecosystems (water, air, soil, sediment, organisms). The concepts will be developed in view of biogeochemical cycles, in order to define the environmental pollution processes. The course will provide the analytical basis for the monitoring of the different ecosystems.</p>
<b>TEACHING METHODS</b>	Lessons, exercises
<b>SUGGESTED BIBLIOGRAPHY</b>	S.E.Manahan – Chimica dell'Ambiente - Piccin

## SYLLABUS

Hrs	Frontal teaching
5	Phases of an environmental research (monitoring purpose, parameters, accuracy, etc.)
5	Sampling (water, sediments, etc.) In natural environments:
5	Preparation of samples for analysis
9	Types of waters (surface, underground, marine, etc.), And their chemical and physical properties. Water chemistry. • Chemical and physical characteristics • Temperature, Salinity, Conductivity, pH, • Carbonates, Bicarbonates, calcium, magnesium, chlorides, sulfates, nitrates, nitrites, ammonia, dissolved oxygen; oxygen demand (BOD, COD, Kubel, TOC), oils and fats, surfactants.
3	Heavy metals
4	micro organic pollutants (PAHs, pesticides, etc.)
3	Water treatments
6	Analytical methods (volumetric, gravimetric and instrumental) for marine matrices (water, sediments, soils, air, etc)
Hrs	Practice
6	exercises and simulations
6	Critical evaluation of the analytical results of waters, sediments, etc.