UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare
ACADEMIC YEAR	2016/2017
MASTER'S DEGREE (MSC)	MARINE BIOLOGY
SUBJECT	MARINE ENVIRONMENT CHEMISTRY
TYPE OF EDUCATIONAL ACTIVITY	C
AMBIT	20879-Attività formative affini o integrative
CODE	13793
SCIENTIFIC SECTOR(S)	CHIM/12
HEAD PROFESSOR(S)	ORECCHIO SANTINO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	102
COURSE ACTIVITY (Hrs)	48
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**ORECCHIO SANTINO** Tuesday 08:00 10:00 Studio Prof. Orecchio, Ed. 17, Viale delle Scienze, Palermo

DOCENTE: Prof. SANTINO ORECCHIO

PREREQUISITES	Numerical calculations and stochiometry
LEARNING OUTCOMES	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. 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. 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. 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.
ASSESSMENT METHODS	The final exam consists of a written test containing at least 15 questions, some of which are multiple choice, in some are asked to discuss a topic treated during the course and some require the numerical solution of a problem. Ad each question is assigned a value (shown next to the question). In addition, the final vote will be assigned based on the valuation of classroom discussion of a topic agreed with the teacher during the course. To pass the exam you need to pass the written test with at least 18/30.
EDUCATIONAL OBJECTIVES	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.
TEACHING METHODS	Lessons, exercises
SUGGESTED BIBLIOGRAPHY	Appunti di lezione 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
8	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, sediemnts, soils, air, etc)

Hrs	Practice
5	exercises and simulations
3	Critical evaluation ot the analytical results of waters, sediments, ecc.