UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare
ACADEMIC YEAR	2019/2020
MASTER'S DEGREE (MSC)	GEORISK AND GEORESOURCES
SUBJECT	APPLIED GEOCHEMISTRY
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50569-Discipline mineralogiche, petrografiche e geochimiche
CODE	17201
SCIENTIFIC SECTOR(S)	GEO/08
HEAD PROFESSOR(S)	VARRICA DANIELA Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	98
COURSE ACTIVITY (Hrs)	52
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	1
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**VARRICA DANIELA** Tuesday 15:00 16:00 presso lo studio sito in via Archirafi 36 III piano

DOCENTE: Prof.ssa DANIELA VARRICA

PREREQUISITES	Basic theoretical-scientific aspects of geochemistry and mineralogy are firmly requested
LEARNING OUTCOMES	By means of the scientific concepts acquired during the course, the student will develop the ability to activate and coordinate surveys aimed at studying the geochemical aspects of natural ecosystems with particular emphasis on the processes relevant in determining the stability, movement, and reactivity of elements at the earth surface. The student will be able to independently assess the results of geochemical prospecting and to provide appropriate theoretical and practical knowledge about analytical methods applied to the study and analysis of geogenic and anthropogenic materials. Ability to present oral and written topics related to geochemical issues with competence and scientific expertise; The expected learning outcomes will be assessed throughout the training program by whole-class discussions. The level and degree of learning will be assessed by the final examination.
ASSESSMENT METHODS	The oral test consists in a conversation aimed to assess skills and subject knowledge gained during the course. The pass mark will be reached when the student shows adequate knowledge and sufficient understanding of the concepts discussed during the class. Below this, the examination will be considered insufficient. The more the student shows a property of language and mastery of the subject, the more the assessment will be positive. Examination will be evaluated in thirtieths.
EDUCATIONAL OBJECTIVES	Course objectives are designed to provide students with advanced knowledge of the chemical composition of the atmosphere, hydrosphere and lithosphere. Particular attention will be devoted to the distribution of chemical elements in the various geo-sectors and the laws governing their mobility throughout the earth surface. Among the objectives of the course is to provide appropriate theoretical and practical knowledge on the analytical methodologies applied to geochemical prospecting.
TEACHING METHODS	Frontal lectures, laboratory and compatible with the resources available to the CdS, 1/2 CFU of the laboratory hours will be devoted to field activities as educational excursions
SUGGESTED BIBLIOGRAPHY	Dongarra' G. & Varrica D. (2004). Geochimica e Ambiente. EdiSes William M. White: Geochemistry (free online textbook) DREVER, J.I. (1997) - The geochemistry of natural waters. Ed. Prentice-Hall, Englewood Cliffsa, New York. FAURE, G. (1991) - Principles and applications of inorganic geochemistry. Ed. MacMillan Publ.Comp., New York. Davis J.C. (2002) - Statistics and Data Analysis in Geology

SYLLABUS

Hrs	Frontal teaching
2	Basic Statistical Principles
2	application of multivariate statistical analysis methods to the applied geochemistry studies
2	Geochemical monitoring-Atmosphere: Particulate matter: Sources of particulate matter; PM10 and PM2.5; chemical speciation of particulate matter; nanoparticles.
2	Geochemical monitoring-Atmosphere: physical properties of the earth's atmosphere; Atmospheric lapse rate;
4	Geochemical monitoring-Atmosphere: Atmospheric dispersion of pollutants; Benzene, asbestos, dioxin and radon. Inorganic and organic gaseous pollutants
3	Geochemical monitoring-Hydrosphere: Ocean Chemical composition; Removal Processes. Ocean acidification
2	Geochemical monitoring-Hydrosphere: Continental waters
2	Geochemical monitoring-Hydrosphere: Water-rock interaction; saturation index
2	Geochemical monitoring-Hydrosphere: Carbonate dissolution
2	Geochemical monitoring-Hydrosphere: Chemical weathering of silicate rocks. Gibbsite and Goethite Solubility
4	Geochemical monitoring-Hydrosphere: Langelier-Ludwig diagram. Chemical composition of rainwater. Mineral Composition of Drinking Water.
2	Geochemical monitoring-Hydrosphere: Eh-pH diagrams and redox equilibria in natural waters
4	Geochemical exploration
2	Surveys for the environmental characterization of contaminated sites. Sampling methods and chemical analysis.
2	Environmental geochemical and biomonitoring
3	Radioactivity - Geochemistry

Hrs	Workshops
3	Theory and Practice of pH and Eh Measurements. Ion chromatography, UV-Vis spectrophotometry, ICP-MS
3	Theory and Practice of determination of carbonate by titration with hydroclhoric acid in drinking water

Hrs	Workshops
6	Compatible with the resources available to the CdS, 1/2 CFU of the laboratory hours will be devoted to field activities as educational excursions