



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare		
ACADEMIC YEAR	2022/2023		
MASTER'S DEGREE (MSC)	NATURAL SCIENCES		
SUBJECT	SOIL ECO-SYSTEMIC SERVICES		
TYPE OF EDUCATIONAL ACTIVITY	B		
AMBIT	50510-Discipline agrarie, gestionali e comunicative		
CODE	20536		
SCIENTIFIC SECTOR(S)	AGR/14		
HEAD PROFESSOR(S)	SCALENGHE RICCARDO	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	94		
COURSE ACTIVITY (Hrs)	56		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	SCALENGHE RICCARDO Monday 08:00 19:00 Piattaforma Teams (prenotarsi con una email) Tuesday 14:00 17:00 Dipartimento SAAF - Agronomia (Edificio 4, Ingresso L, 2° piano) Wednesday 8:00 10:00 Sede del Corso di Studi Thursday 08:00 19:00 Piattaforma Teams (prenotarsi con una email) Friday 08:00 19:00 Piattaforma Teams (prenotarsi con una email)		

DOCENTE: Prof. RICCARDO SCALENGHE

PREREQUISITES	Fundamentals of physics, chemistry, biology, lithology, geomorphology, mineralogy.
LEARNING OUTCOMES	Knowledge and understanding skills Acquisition of advanced methods and knowledge for understanding soils, their physical, chemical and biological properties, and soil ecosystem services, especially in natural environments. Acquisition of specific and technical understanding of pedology. Acquisition of know-how on soil classification and understanding of soil features, properties and importance of soil ecosystem services in natural environments. Understanding of soil threats for a correct environmental soil evaluation and conservation in nature. Ability to apply knowledge and comprehension Ability to understand and organize autonomously studies on soil genesis, evolution and functions, soil ecosystem services and correct sustainable management of soil resources in natural, anthropic and rural environments. Ability to understand if, when and how environmental issues require soil science for proposing suitable and effective solutions. Ability in judgement Ability to evaluate logics and results of sectorial studies on soil and soil-environment relationships. Ability to evaluate findings from soil studies for facing environmental issues. Ability to find autonomously hypothesis of solutions. Communication skills Ability to present results of soil studies/applications to heterogeneous audiences (scientists, technicians, farmers, policy makers, etc.), even using multimedia tools. Ability to interact and integrate with specialists in different disciplines. Ability to highlight and support the importance of soil science in any contexts. Ability to communicate efficiently technical and scientific justification when facing environmental issues and in nature conservation. Ability to learn Ability in self-updating by reading of technical and scientific publications on topics of the soil science (especially applied Pedology) and environmental sciences. Acquiring skills and suitable language for pursuing further higher-level academic courses (i.e. Master, PhD) and for participating in seminars and qualifying courses on both soil and natural sciences.
ASSESSMENT METHODS	Students will be evaluated by one final oral exam on topics lectured in the course programme. Score ranges from 18 (minimum) to 30 cum laude. Depending on the ability of students, from 3 to 5 questions will be randomly asked. Student knowledge will be evaluated considering answer correctness, language pertinence, ability in expressing logical connections among topics of soil science.
EDUCATIONAL OBJECTIVES	Soil Ecosystem Services course, for students in natural sciences master programme, concerns about soil genesis, evolution, classification and diversity. Soil is regarded as complex natural and environmental system capable to offer ecosystem services to human and to the environment. Aim of the course is the acquisition of fundamentals and methodologies that master students will use for the analysis of the pedogenetic factors and processes, soil classification, and the evaluation of the sustainable management of soil resource and its functions. Students will pay huge attention on theoretical and practical aspects on soil ecosystem services and will be able to express, even briefly, evaluations on soil quality and functioning role in the environment. Students will acquire the correct know-how for interpreting soil resources as natural body and environmental system providing essential ecosystem functions and also will acquire basics on sustainable soil management and conservation.
TEACHING METHODS	40 hours of lectures in classroom and 16 hours of exercises in lab and in field. Reading materials and slides of lecture presentations will be provided in course.
SUGGESTED BIBLIOGRAPHY	Carmelo Dazzi (2016) – Fondamenti di Pedologia, II Edizione. Le Pensur. ISBN: 978-88-95315-37-9 Edoardo A.C. Costantini & Carmelo Dazzi (2013) - The Soils of Italy. ISBN: 978-94-007-5641-0

SYLLABUS

Hrs	Frontal teaching
2	Introduction and general keys
2	SOIL ECOSYSTEM: Soil as natural body - Soil as energy transformer - Soil as open system.
10	SOIL CLASSIFICATION AND SOIL GEOGRAPHY: General aspects of soil classification - International soils classification systems - Mediterranean soils - Soil mapping
4	PEDODIVERSITY: Concepts and objectives - measuring pedodiversity - applications.
10	SOIL FUNCTIONS: Provision of food, fiber and fuel - Provision of construction materials - Foundation for human infrastructures - Cultural heritage - Habitat for organisms and pharmaceutical source - Carbon sequestration - Water purification and flood regulation - Nutrient recycling - Climate Regulation.
2	SOIL VALUE: ecological, economic, social and cultural.
6	SOIL THREATS: Erosion - Loss of organic matter - Contamination and pollution - Sealing - Compaction - Loss of biodiversity - Salinization and Akalinization - Desertification - Other soil threats.
2	SUSTAINABLE SOIL MANAGEMENT
2	SOIL SECURITY

Hrs	Workshops
6	SOIL SURVEY: soil studies - soil sampling.
6	Soil LAB ANALYSIS: Particle size analysis - pH - Electric conductivity - Cation Exchange Capacity - Total carbonates.
4	SOIL EVALUATION FOR NATUR CONSERVATION: Priciples - Objectives - Methods.