UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2023/2024		
MASTER'S DEGREE (MSC)	AGROENGINEERING AND FORESTRY SCIENCES AND TECHNOLOGIES		
INTEGRATED COURSE	SOIL EVALUATION AND RECOMPOSITION		
CODE	21790		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	AGR/13, AGR/14		
HEAD PROFESSOR(S)	CONTE PELLEGRINO	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)	CONTE PELLEGRINO	Professore Ordinario	Univ. di PALERMO
	SCALENGHE RICCARDO	Professore Associato	Univ. di PALERMO
CREDITS	6		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	**CONTE PELLEGRINO**		
	Wednesday 10:00 12:00	Dipartimento di Scienze Agrarie, Alimentari e Forestali, v.le delle Scienze ed. 4 - primo piano stanza n. 140. Durante il semestre in cui il Prof. Conte e' impegnato con l'attivita' didattica, il ricevimento va concordato via e-mail	
	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. PELLEGRINO CONTE

PREREQUISITES	Basic knowledge of general chemistry, organic chemistry, soil chemistry, mathematics, and physics
LEARNING OUTCOMES	Knowledge: students must develop knowledge and critical thinking in the understanding of the problems concerning contaminated systems. Comprehension: Students must show that they understood the basics of the chemistry underlying the contaminated systems Ability to apply knowledge and understanding: Ability to recognize ed autonomously organize the surveys and elaborations necessary for the correct evaluation of the soils aimed at the recovery of the degraded areas. Ability to recognize if and when a pedo-environmental problem is solvable by using the knowledge acquired on soil science. Making judgments: students must be able to evaluate autonomously the problems that may not have been covered during the course, but that are connected to the topics covered by the lessons. Communication skills: students must be able to understand texts written in Italian and English and must be able to communicate effectively clear by following the rules of the scientific method. Also, they must know clearly and unambiguously how to communicate their conclusions, as well as knowledge and the ratio underlying them to specialist and non-specialist interlocutors. Learning Skills: Students need to develop skills allowing them to continue learning by themselves.
ASSESSMENT METHODS	The learning assessment will be based on an oral exam aimed at the evaluation of the degree of the critical understanding of the main topics of the discipline. The mark is in the range of 18-30/30 (cum laude). The minimum score is 18, the maximum score is 30 cum laude. The ways with which the final evaluation is formulated will depend on the knowledge of the topics and on the student's ability to deduce and process information, on his/her ability to apply the knowledge acquired to contexts different from those of the discipline, and by the student's ability to present the different topics during the interview. The mark will be between a) 18-21 when the aforementioned knowledge and skills are sufficient; b) 22-25 when the aforementioned knowledge and skills will be moderate; c) 26-29 the above knowledge and skills will be good to excellent; d) 30-30 cum laude when the aforementioned knowledge and skills are excellent.
TEACHING METHODS	Lessons and exercises

MODULE
RECOVERY OF DEGRADED AREAS

Prof. PELLEGRINO CONTE

SUGGESTED BIBLIOGRAPHY	
Appunti dalle lezioni; AA.VV. La bonifica biologica di siti contaminati da idrocarburi, Hoepli Campanella, Conti, L'ambiente conoscerlo e proteggerlo, Carrocci Faber Adani et al., I metalli nell'ambiente, FrancoAngeli Baird, Chimica ambientale, Zanichelli	
AMBIT	21005-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	43
COURSE ACTIVITY (Hrs)	32
EDUCATIONAL OBJECTIVES OF THE MODULE	
The course aims at the achievement of expertice on 1. characterization of contaminated sites in order to define the best remediation practice; 2. use and re-use of biomasses from wastes. Sustainable techniques are described among which fitoremediation and its possible uses is accounted for.	

SYLLABUS

Hrs	Frontal teaching
5	Relevance of soil in environmental equilibria. Contamination and pollution phenomena
5	Different types of contaminants. Contaminants from agricutural and other anthropic activities. Natural contamination
5	How to do environmental remediation. Block diagram to design environmental remediation. Sampling methods. Sample preparation and storing.
5	Soil remediation. How a remediation must be designed. Sampling methods. In situ and ex situ remediation. Biomimetic catalysts

Hrs	Practice
12	Analytical techniques for environmental monitoring. Atomic absorption spectroscopy; liquid and gas chromatography; detection techniques for the environmental contaminants

SUGGESTED BIBLIOGRAPHY

1.IUSS Working Group WRB. 2022. World Reference Base for Soil Resources. International soil classification system for naming soils and creating legends for soil maps. 4th edition. International Union of Soil Sciences (IUSS), Vienna, Austria, 234 p.
2. Soil Survey Staff. 2014. Keys to Soil Taxonomy. 12th Edition. Natural Resources Conservation Service. United States Department of Agriculture. Washington DC USA, 362 p.
3. Certini G, Scalenghe R. 2006. Soils: Basic Concepts and Future Challenges. Cambridge University Press, Cambridge, ISBN-13 978 0 521 85173 2, 328p
4. Certini G, Ugolini FC. 2021. Basi di Pedologia. Cos'è il suolo, come si forma, come va descritto e classificato. Edagricole, Milano, ISBN 8850656076 230 p.
5. Dazzi C. 2013. Fondamenti di Pedologia. Le Penseur, Brienza, ISBN-13 978-88-95315-20-1, 356 p.
6. Costantini EAC (Ed). 2009. Manual of Methods for Soil and Land Evaluation. Science Publishers, Enfield, NH USA, ISBN 9781138113985, 549 p.
7. White RE. 2015. Understanding Vineyard Soils. Second Edition. Oxford University Press, ISBN 9780199342068, 280 p.
8. Woods D. 1992. The Power of Maps. Guilford Press, New York, NY USA, ISBN 9780898624939, 248 p.

[I testi 1-2 sono scaricabili gratuitamente dal web. Texts 1-2 can be downloaded for free from the web.]

AMBIT	21005-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	43
COURSE ACTIVITY (Hrs)	32

EDUCATIONAL OBJECTIVES OF THE MODULE

Introduction: The critical aspect in effectively managing a natural or forest environment lies in the proper evaluation of the soil. A high-quality soil is fundamental for preserving and enhancing biodiversity, as well as ensuring the sustainable management of natural resources. Soil suitability maps and assessments of environmental characteristics serve as vital tools for conducting this evaluation. In Mediterranean environments, there are distinct advantages and disadvantages regarding the conservation and sustainable management of ecosystems. This course aims to guide students in analyzing the crucial components required to assess the suitability of the soil for the natural environment or forest management within Mediterranean settings.
Course Contents:
I. Soil Evaluation Methods: FAO methods for evaluating soil and environmental characteristics
Qualitative approaches to assessing soil suitability
Quantitative methods for evaluating natural resources
II. Evaluation Principles: Introduction to principles of soil evaluation
Advanced practices in the evaluation and sustainable management of natural resources
Soil suitability assessment for the natural environment or forest management
Course Objectives: Upon completion of the course, students will be able to:
i) Understand the fundamental principles of soil evaluation
ii) Provide examples of soil evaluation for the natural environment or forest management
iii) Apply appropriate methods for evaluating environmental characteristics of soil and ensuring sustainable resource management
iv) Analyze and present the results of soil evaluations
Course Methodology: This course, worth 3 credits, will consist of classroom lectures, laboratory sessions, and practical exercises. The instructor will provide students with specific study materials throughout the course to facilitate their learning and understanding of concepts related to the sustainable management of soils for the natural environment or forest management.

SYLLABUS

Hrs	Frontal teaching
4	The maps and descriptions are designed to guide students in evaluating the critical components that help identify the risk factors or potential of a territory for managing high-quality forest environments in Mediterranean regions. We begin with an introduction to soil evaluation methods that analyze the risk factors or potential of the land for managing natural environments.
10	we explore various methods that support the decision-making process in assessing the risk factors or potential of natural environments at a regional level. These methods include: • FAO methods for soil evaluation, which specifically focus on the risk factors or potential for managing natural environments, • Qualitative methods for evaluating soil risk factors or potential, • Quantitative methods for assessing soil quality, taking into consideration the risk factors or potential, • Physical land planning and zoning strategies for managing natural environments.
6	During the practical exercises, we emphasize that the most critical aspect of managing a natural environment is accurately evaluating the site-specific risk factors or potential. Understanding these elements is essential for effective environmental management. Through engaging exercises conducted in small groups, we provide specific evaluations and facilitate collective discussions on the risk factors or potential associated with each site.

Hrs	Workshops
12	The laboratory sessions focus on evaluating the risk factors or potential of the site for managing natural environments