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	SOILS AND QUALITY INDICATORS		
CODE	21789		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	AGR/14, AGR/13		
HEAD PROFESSOR(S)	LAUDICINA VITO ARMANDO	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)	LAUDICINA VITO ARMANDO	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	**LAUDICINA VITO ARMANDO**		
	Wednesday 11:00 14:00 Dip. SAAF, 1° piano, studio 142		
	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)		

PREREQUISITES	basic knowledge of general chemistry, organic chemistry, soil chemistry
LEARNING OUTCOMES	Knowledge and understanding: the student will be able to understand the importance of soil indicators as a key tool for assessing the quality or degree of deterioration. Ability to apply knowledge and understanding: the student will be able to choose the most appropriate indicators for assessing soil quality and for their sustainable management. Independent judgment: the student using the results of the physical, chemical and biochemical analyzes of the soil will be able to evaluate their most suitable use. Furthermore, you will be able to predict the effects of land use on its quality. Communication skills: the student will be able to describe the quality of the soil and indicate, case by case, the indicators to be used. Learning skills: the student will be able to deepen the relationships between the different properties of the soil used for the assessment of its quality through the consultation of soil science scientific texts and journals.
ASSESSMENT METHODS	The learning assessment will be verified by an oral exam. The votes will be in the range 18-30 cum laude. The minimum score is 18, the maximum score is 30 cum laude. The way how the final evaluation will be formulated depends on the knowledge of the topics, on the deduction ability, on the information processing, as well as on the capacity to apply the knowledge interdisciplinarly. The vote will be between a) 18-21 when the above knowledge and skills are sufficient; b) 22-25 when the aforementioned knowledge and skills will be fair; c) 26-29 theabove knowledge and skills will be from good to excellent; d) 30-30 with honors when the above knowledge and skills are excellent.
TEACHING METHODS	classroom lessons and laboratory activity

MODULE **AGRICULTURAL PEDOLOGY**	
Prof. RICCARDO SCALENGHE	

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

AMBIT	21013-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	43
COURSE ACTIVITY (Hrs)	32

EDUCATIONAL OBJECTIVES OF THE MODULE
This module provides a basic introduction to the study of soils and landscape. Topics include soil forming factors, soil classification, physical, chemical and biological properties of soils. The module provides visions and tools to analyse complex situations from soil to grape to wine on a strategic and operational level. The module aims to provide students with the skills: i) understanding and analysing pedological, and climatic components of the terroir of a vineyard, ii) judging the relevance of choices and cultural techniques applied on a given vineyard in relation to environmental risks. The course is divided into sections: 1- basic concepts that integrate the formation, distribution and classification of soils; 2- influence of soil on living organisms, particularly human use of land for plant growth; 3- current and future problems associated with the management, conservation, and sustainability of soil resources.

SYLLABUS

Hrs	Frontal teaching
2	The concept of soil.Factors of soil formation. Soil functions. Pedogenic processes
4	FAO guidelines for soil description I: general site information, registration and location. Soil formation factors. FAO guidelines for soil description II: soil horizon designation. Master horizons and layers. Subordinate characteristics within master horizons. FAO guidelines for soil description III: subordinate characteristics within master horizons.
4	USDA Field Book for Describing and Sampling Soils I: master horizons and layers. Munsell colour, Attenberg limits, COLE
5	Soil Taxonomy (ST): the 12 Orders
5	World Reference Base (WRB): the 32 Great Groups

Hrs	Workshops
2	Harmonisation ST-WRB
2	Land Capability Classification
8	Description of a landscape; Drafting of a soil survey report

MODULE
SOIL QUALITY INDICATORS

Prof. VITO ARMANDO LAUDICINA

SUGGESTED BIBLIOGRAPHY

Appunti del Docente distribuiti durante il corso
MiPAF, 2004. Metodi di analisi biochimica del suolo. Ed. Franco Angeli
Weil R.R., Brady N.C., The nature and properties of soils. Pearson editore
Violante P., Chimica e fertilità del suolo, Edagricole, 2013.

AMBIT	21013-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	43
COURSE ACTIVITY (Hrs)	32

EDUCATIONAL OBJECTIVES OF THE MODULE

To provide students with the concept of soil as a living system, dynamic entity and central node of biogeochemical cycles and environmental balances. The concept of soil quality is presented not as a mere supply of nutritional elements linked to the productive and agronomic aspects, but as an integration of the physical, chemical and biological factors that contribute to the maintenance and conservation of the soil resource. In addition, provide students with the tools to assess the quality of the soil, or its degree of deterioration.

SYLLABUS

Hrs	Frontal teaching
2	Soil quality definition. The concepts of indicator and index. Main indicators and indices of soil quality
2	Recalls: The non-living organic substance of the soil as an indicator of soil quality. Relations between organic matter and soil properties
2	Soil microbial biomass: measure, significance and variation factors
4	Soil microbial activity: measurement, significance and variation factors
2	Soil respiration: basal, induced, respiration rate, meanings and variation factors
6	Simple indicators of soil quality: the microbial carbon / organic carbon ratio; the metabolic quotient and mineralizing power of the soil - meaning and variation factors.
2	Soil enzymes. The hydrolytic activity of the soil in the carbon, nitrogen, phosphorus and sulfur cycle. The redox activity of the soil. Catalytic activities as soil quality indicators.

Hrs	Workshops
12	Main methods of soil biochemical analysis: carbon and nitrogen of microbial biomass, soil respiration, soil enzymes, structure of the soil microbial community