



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2022/2023		
BACHELOR'S DEGREE (BSC)	PROPAGATION AND NURSERY MANAGEMENT IN THE MEDITERRANEAN ENVIRONMENT		
INTEGRATED COURSE	SUBSTRATE FERTILITY AND MINERAL NUTRITION OF PLANTS IN THE NURSERY		
CODE	21688		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	AGR/13		
HEAD PROFESSOR(S)	CONTE PELLEGRINO	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)	CONTE PELLEGRINO LAUDICINA VITO ARMANDO	Professore Ordinario Professore Ordinario	Univ. di PALERMO Univ. di PALERMO
CREDITS	8		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>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 è impegnato con l'attività didattica, il ricevimento va concordato via e-mail</p> <p>LAUDICINA VITO ARMANDO Wednesday 11:00 - 14:00 Dip. SAAF, 1° piano, studio 142</p>		

DOCENTE: Prof. PELLEGRINO CONTE

PREREQUISITES	Students must be familiar with the basics of mathematics, and chemistry
LEARNING OUTCOMES	<p>Knowledge: Students must acquire knowledge and criticism about the questions related to substrates to be applied in plant nurseries.</p> <p>Comprehension of: Students must be independent in evaluating all the problems concerning all the subjects related to the characteristics of substrates to be applied in plant nurseries regardless of the fact that those have been exhaustively reported during the course.</p> <p>Ability to: Students must be able to understand written documents in both Italian and English. They must develop communicative skills by applying the rules of the scientific method</p>
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 interdisciplinarily. 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 the above knowledge and skills will be from good to excellent; d) 30-30 with honors when the above knowledge and skills are excellent.
TEACHING METHODS	Teaching is made in modules each with frontal lessons. Distance teaching will be provided only when national law and internal regulations will allow it.

**MODULE
SUBSTRATE FERTILITY**

Prof. PELLEGRINO CONTE

SUGGESTED BIBLIOGRAPHY

Sequi P. Fondamenti di chimica del suolo. Patron editore ISBN-10 885552069 :
Violante P. Chimica e fertilità del suolo. Edagricole ISBN-10 : 8850654170

AMBIT	70243-Fondamenti di produzioni vegetali *
INDIVIDUAL STUDY (Hrs)	60
COURSE ACTIVITY (Hrs)	40

EDUCATIONAL OBJECTIVES OF THE MODULE

Provide students with the theoretical basis for a good knowledge of the fertility of the main substrates used in the nursery as a result of the interaction of the physical, chemical and biological properties of the substrates. During the course, the physical, chemical and biological properties of the substrates will be illustrated and discussed in order to better orient the fertilization and the choice of plants to cultivate. At the end of the course, the student will have acquired the necessary knowledge to evaluate the fertility of substrates.

SYLLABUS

Hrs	Frontal teaching
4	The concept of soil. Main substrates for nurseries. Chemical composition of the soil and substrates. Soil and substrate as multi-element, multi-component, open systems. The concept of sustainable use of soil and substrate. Processes of transformation, translocation, addition, loss.
4	The inorganic component of the soil and substrate.
4	The organic component and alteration processes. Role and functions of organic matter.
2	Mineral, organic and organo-mineral colloids.
3	The liquid phase: structure and properties of the water molecule. Water content and water potential of water in the soil and substrate. Forms of water and hydrological constants. Movement of water in the soil (substrate) -plant-atmosphere system. The gaseous phase of the soil: telluric air and its composition, gas exchanges between the soil, substrate and atmosphere.
6	Physical properties: texture, state of aggregation of particles, porosity, real and apparent density. The absorbing power of the soil and substrates. Importance of chemical-physical absorption. Cation exchange and anion exchange.
2	The reaction: the pH and range of variation in soils and substrates.
4	Soils and acidic substrates: causes of acidification and acidity correction. Soils and halomorphic substrates: causes of alkalization and salinization.
3	Biogeochemical cycles of the elements of fertility (nitrogen, phosphorus, potassium)

**MODULE
MINERAL NUTRITION OF PLANTS**

Prof. VITO ARMANDO LAUDICINA

SUGGESTED BIBLIOGRAPHY

Violante P., Chimica e fertilità del suolo. edagricole ISBN 13: 9788850654178
Sequi P., Ciavatta C., Miano T., Fondamenti di chimica del suolo. Patron editore ISBN 8855528416

AMBIT	70274-Altre conoscenze utili per l'inserimento nel mondo del lavoro
INDIVIDUAL STUDY (Hrs)	60
COURSE ACTIVITY (Hrs)	40

EDUCATIONAL OBJECTIVES OF THE MODULE

Provide students with the theoretical basis for programming the mineral nutrition of plants in the nursery in relation to the type of plant and substrate in use. In particular, students will be provided with the necessary tools to evaluate the dynamics of the nutritional elements in the substrates used in the nursery in order to determine the quantities to be made and the methods of distribution.

SYLLABUS

Hrs	Workshops
2	The chemical elements of soil fertility: macronutrients and micronutrients.
4	Nitrogen in the soil-plant system
2	Phosphorus in the soil-plant system
2	Potassium in the soil-plant system. Sulfur in the soil-plant system.
2	Fertilizers: corrective, soil improvers, fertilizers. Reactions of fertilizers. Title of fertilizers. Release time.
3	Nitrogen, phosphoric and potassium fertilizers. Compound and complex mineral fertilizers. Binary fertilizers. Ternary fertilizers. Organic fertilizers. Organo-mineral fertilizers.
4	nutritional solutions
3	Reading and interpretation of the soil analysis certificate
8	Nutrient management and fertilization plans
10	Main methods for the determination of soil nutrients