

Course Unit	Soil Fertility		Field of study	Earth Sciences	
Bachelor in	Agronomic Engineering		School	School of Agriculture	
Academic Year	2022/2023	Year of study	2	Level	1-2
Type	Semestral	Semester	2	ECTS credits	6.0
Workload (hours)			162	Contact hours	
			T	30	TP
			-	PL	30
			TC	-	S
			-	E	-
			OT	20	O
			-	-	-
Code 9086-307-2201-00-22					

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Margarida Maria Pereira Arrobas Rodrigues

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. The nutrients that there are necessary for plant nutrition and their dynamics in the soil;
2. Know the factors that have influence on the bioavailability of nutrients in the soil;
3. Know the main types of fertilizers in the market and to know how to use them; should understand the consequences of the use of fertilizers;
4. To know the techniques of soil fertility evaluation.
5. Be able to interpret a soil analysis report and perform a recommendation for fertilization.

Prerequisites

Before the course unit the learner is expected to be able to:
Students should have some knowledge of pedology.

Course contents

Factors that affect the crop production. Principles and laws of plant nutrition. Basic soil-plant relationships. Classification of nutrients. Role of nutrients in the plants. Behavior of nutrients in the soil. Classification of fertilizers and their main features. Techniques for its use. Soil testing and plant analysis. Diagnosis of soil fertility and the nutritional status of plants. Fertilizer recommendations.

Course contents (extended version)

1. Bases of Crop Production
 - 1. 1. Growth rate.
 - 1. 2. The factors that affect the plant growth .
 - 1. 3. Relationship between environmental factors and plant growth.
 - 1. 4. . Laws and Principles of Plant Nutrition.
2. Availability and absorption of nutrients
 - 2. 1. Activity of the nutrients in soil solution. Concepts of availability and bioavailability.
 - 2. 2. Mobility of nutrients: Interception root; Mass flow; Diffusion.
 - 2. 3. Importance of roots in the absorption of nutrients: The morphological structure of roots.
 - 2. 4. Nutrient interactions (phenomena of ionic synergism and antagonism).
 - 2. 5. Symbiotic nitrogen fixation.
 - 2. 6. The leaf as a body (structure to absorb nutrients).
3. Essential elements for plant nutrition.
 - 3. 1. Concept of essential nutrient. Classification of nutrients.
 - 3. 2. Macro and Micronutrients.
4. Introduction to fertilizers. Fertilizers as inputs.
 - 4. 1. General classification of fertilizers.
 - 4. 2. Fertilizers: Chemical and physiological characteristics.
 - 4. 3. Lime and organic fertilisers.
 - 4. 5. Techniques of application of fertilizers.
5. Evaluation of soil fertility .
 - 5. 1. Biological methods.
 - 5. 2. Chemical methods: Soil Analysis; Plant Analysis.
 - 5. 3. Recommendation of fertilizers.

Recommended reading

1. Santos, J. Q. 2015. Fertilização. Fundamentos Agroambientais da Utilização dos Adubos e Correctivos. Publindústria.
2. Marschner, P. (2012). Marschner's Mineral nutrition of higher plants. Academic Press, London.
3. Havlin, J. L. , Beaton, J. D. , Tisdale, S. L. , & Nelson, W. L. , (2005). Soil Fertility and Fertilizers: An Introduction to Nutrient Management, 7th ed. Pearson Prentice Hall.
4. Varennes, A. (2003). Produtividade dos solos e ambiente. Escolar editora.
5. Ministério da Agricultura, do Desenvolvimento Rural e das pescas. (1997). Código das Boas Práticas Agrícolas.

Teaching and learning methods

Lectures with exposure of the material, practical classes on the calculations for drawing up a recommendation for fertilization; practical laboratory classes for diagnosis of the condition of nutrients in the soil.

Assessment methods

1. Normal Student - (Regular) (Final, Supplementary)
 - Practical Work - 40%
 - Final Written Exam - 60%
2. Work Student - (Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 100%
3. Special Dates - (Regular, Student Worker) (Special)
 - Final Written Exam - 100%

Language of instruction

Portuguese

Electronic validation			
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21-12-2022	29-12-2022	29-12-2022	29-12-2022

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