

Course Unit	Management of Soil Fertility	Field of study	Earth Sciences
Master in	Agroecology	School	School of Agriculture
Academic Year	2023/2024	Year of study	1
Type	Semestral	Semester	1
Workload (hours)	162	Contact hours	T 30 TP - PL 30 TC - S - E - OT 4 O -
Level	2-1	ECTS credits	6.0
Code	6348-747-1104-00-23		

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. To know the importance of soil organisms
2. To know the available tools for the evaluation of soil fertility
3. To know the dynamic of nutrients
4. Identify the factors influencing nutrient management.
5. Identify the factors related to environmental degradation and the strategies for mitigation negative environmental impacts

Prerequisites

Not applicable

Course contents

I- Soil Biology II- Soil and plant analysis III- Integrated fertilizers management IV- Fertilization and environmental pollution.

Course contents (extended version)

1. Nutrient Reservoirs in agroecosystems
 - 1. 1 Soil solution.
 - 1. 2 Minerals.
 - 1. 3 Organic matter.
 - 1. 4 The soil-plant system.
2. Nutrient Cycling.
 - Carbon cycle.
 - Nitrogen cycle.
 - Phosphorus cycle.
3. Soil Biology
 - 3. 1 Soil biodiversity. Biological interactions and processes.
 - 3. 2 Rhizosphere. Microbial control of nutrient availability.
 - 3. 3 Symbiosis and mutualism. Benefits to the ecosystem.
4. Biofertilizers
 - 4. 1. Nitrogen fixing organisms. Involved mechanisms.
 - 4. 2. Phosphorus solubilizing organisms. Mechanisms involved.
 - 4. 3. Other organisms with fertilizer value.
5. Soil and plant analysis. Biological tests
 - 5. 1 Principles of soil and plant analysis.
 - 5. 2 Techniques for soils and plant tissues. Analytical techniques. Interpretation of results.
 - 5. 3. Planning biological tests.
 - 5. 4. Fertilizers recommendation. The dose concept.
6. Integrated fertilizers management.
 - 50 / 5000 Resultados da tradução 6. 1 The origin of nutrients in agroecosystems.
 - 6. 2 Fertilization in sustainable organic farming systems. Nutrient use efficiency .
 - 6. 3. Factors to consider in an integrated nutrient management plan
7. Fertilization and environmental pollution.
 - 7. 1 Pollution of the atmosphere, water and soil from agricultural sources.
 - 7. 2 Strategies for mitigating the environmental.

Recommended reading

1. Alley, M. M. ; Vanlauwe, B. 2009. The role of fertilizers in integrated plant nutrient management. IFA, CIAT, TSBFI. Paris
2. Bardgett, R. 2005. The biology of soil. A community and ecosystem approach. OXFORD University Press.
3. Coleman, D. C. ; Crossley Jr, D. A. , 2004. Fundamentals of soil ecology. 2nd ed. Elsevier Inc
4. Havlin, J. L. , Beaton, J. D. , Tisdale, S. L. , & Nelson, W. L. , (2014). Soil Fertility and Fertilizers: An Introduction to Nutrient Management, 7th ed. Pearson Prentice Hall.
5. Jones, J. Benton. 2001. Laboratory guide for conducting soil test and plant analysis. CRC Press Paul, Eldor (ed). 2007. Soil microbiology, ecology and biochemistry. 3th ed. Academic Press.

Teaching and learning methods

Presentation of theoretical themes in the classroom lectures; practical classes with calculations for the preparation of nutrient balances on a farm, fertilizer use and nutrient use efficiency; laboratory classes of techniques for diagnosis of soil fertility status.

Assessment methods

1. Regular Student-Final Mark (NF) = TP+EF; NF>9. 49 - (Regular) (Final, Supplementary)
2. Worker Student: Final Exam - 100% (N>9. 49) - (Student Worker) (Final, Supplementary)
3. Special Dates: Final Exam - 100% ; NF>9. 49 - (Regular, Student Worker) (Special)

Language of instruction

Portuguese

Electronic validation

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22-01-2024	22-01-2024	22-01-2024	23-01-2024