UNIVERSITÀ DI PISA

SUSTAINABLE AGROECOSYSTEM MANAGEMENT

NICOLA SILVESTRI

Anno accademico	2021/22
CdS	AGRIFOOD PRODUCTION AND AGROECOSYSTEM MANAGEMENT
Codice	387GG
CFU	6

Moduli	Settore/i	Tipo	Ore	Docente/i
GESTIONE SOSTENIBILE DELL'AGRO-ECOSISTEMA	AGR/02	LEZIONI	64	NICOLA SILVESTRI

Learning outcomes

Knowledge

At the end of the course:

- the student will have acquired the necessary knowledge to know and analyze the different aspects that modulate the relationship between the exercise of agricultural activity, on the one hand and environment protection and land management, on the other
- the student will become aware of the cognitive tools useful to quantify the extent of the phenomena of possible environmental alteration, succeeding in critically assessing the limits and possibilities of use
- the student will be able to assess the level of agronomic consistency attributable to the choices made by the farmer and to suggest any corrections and improvements

Assessment criteria of knowledge

For the assessment of the knowledge will not be carried out tests in itinere, but will be organized special opportunities for verification between teacher and students that will take place within the hours intended for exercises aimed at both the evaluation of acquired knowledge, and the deepening of issues more specifics. In particular:

- the knowledge of erosive phenomena and of the factors able to trigger the development of increasing the vulnerability of the territory and mitigating its effects.
- the evaluation of cropping systems through the use of diversified reading keys able to highlight the economic, agronomic and environmental aspects
- the study of the environmental fate of plant protection products, aimed at providing the elements useful for a selection of active ingredients based on the characteristics of ecotoxicity and exposure, as well as those of effectiveness of action
- an in-depth study of surface / underground water monitoring techniques and of the most useful methodologies for the interpretation of the results obtained in terms of nutrient release from cultivated fields
- the management of organic matter in agriculture and the problems related to the conservation of soil fertility

Skills

At the end of the course:

- the student will have acquired at the end of the course the ability to face the problems related to the phenomena of environmental contamination, distinguishing the source, the critical path and the target of the possible impact agents
- the student will also have the necessary tools to face an analysis of the sustainability of cultural systems such as indicators, simulation models and cartographic superposition techniques, techniques for multi-criteria analysis

Assessment criteria of skills

During the course of the course, assessment sessions are carried out during which the student will have to demonstrate:

- have acquired the skills to carry out simple environmental impact analysis exercises
- have acquired the ability to use techniques able to allow a synthesis between the various aspects analysed

Behaviors

At the end of the course, the student can acquire and / or develop:

- the ability to analyse the agricultural realities present in a territory
- the ability to set up a monitoring program capable of highlighting possible phenomena of environmental alteration
- the ability to critically evaluate the technical choices carried out in the company in the light of the characteristics of vulnerability and suitability expressed by the territory

Assessment criteria of behaviors

The behavior verification will be carried out:

- during the exercises in the IT classroom
- during the assessment exercises aimed at assessing the student's behavior in relation to the problems posed by the teacher

Prerequisites

In order to tackle the teaching of sustainable management of the agro-ecosystem, the initial knowledge of:

- organic and inorganic chemistry
- soil chemistry
- agrarian ecology
- agronomy
• machinery

Teaching methods

- frontal lessons are held with the help of slides
- computer lab practices are performed using the PC and SW dedicated to calculation (Excel)
- visits to experiences of agro-environmental interest (phytotratment, land reclamation, etc.)
- the e-learning site of the CdS is used, where the teaching material used in the lectures is provided, but also for communication with the students
- interactions between teacher and students are also carried out through office-hours, e-mails and through student advisors
- no intermediate tests are scheduled

Syllabus

1. Introduction to the course. Review of general agronomy and agricultural ecology. Some recalls of statistics. The concept of sustainability. Multi-functional agriculture.
2. The cultivation system. Overcoming the traditional approach of the agricultural model. The different types of agriculture. The comparison between alternative agricultural systems.
3. A practical case study: integrated analysis of cropping systems in the plains and hills. Agronomic, economic, energy and nutritional evaluations.
4. The main environmental problems related to the exercise of agriculture. The analysis of environmental impact
5. The erosive processes: forms, factors and methods of estimation. The USLE equation (Universal Soil Loss Equation)
6. The application of the USLE to a specific case.
7. Indicators. Advantages and limitations of the use of indicators. Techniques for a correct use of indicators. Indicators for the assessment of business types, water quality and soil. Analysis of trends in agriculture.
8. Management of organic soil matter. Balance of carbon and nitrogen. The use of organic fertilizers.
9. The ecotoxicological evaluation of plant protection products. The physical and chemical quantities useful for predicting the environmental fate. The use of rating indices (GUS,% L, M2 and GHI). The application of the fugacity model.
10. The phenomenon of eutrophication of water. Measurement techniques, predisposing conditions and mitigation measures.
11. The use of isotopic techniques in environmental surveys. Application to the problems of environmental issues.
12. The basic concepts of phytotreatment and phytoremediation. Possible types of systems for the treatment of water and soil. Design principles.
13. The problems of Lake Massaciuccoli and adjacent land reclamation. Visit to a phytotreatment system.
14. Techniques for the composition of information from indicators. Multi-criteria analysis.
15. The evolution of the concept of landscape and of the rules in its conservation. The techniques for the analysis of the agricultural landscape.

Bibliography

- By: P. Ceccon, M. Fagnano, C. Grignani, M. Monti, S. Orlandini. Agronomia. EDISES: Edizioni Scientifiche ed Universitarie. Napoli, 2017
- Landi, Agronomia e ambiente, Edagricole, Bologna, 1999
- Bonari E. (by), Coltivazioni erbacce e rischi ambientali in provincia di Pisa. Edizioni ETS, Pisa, 1993.
- Bagarello V., Ferro V., Erosione e conservazione del suolo. McGraw-Hill, 2006.
- AA.VV., Agricoltura e ambiente. Edagricole, Bologna, 1991
- AA.VV., Agricoltura e tutela delle acque nel bacino del lago di Massaciuccoli. Pacini Editore, Pisa, 2013

- Vighi M., Funari E., Pesticide risk in groundwater. Lewis Publishers, 1995

Non-attending students info

Non-attending students can follow the lectures using the teaching material made available by the teacher before the start of the course on the e-learning site of the CdS including the files related to the practices performed in the PC classroom and by following the lessons schedule.

Assessment methods

The exam consists of an oral test lasting about 45 minutes. The interview will focus on the whole program and will include the reconstruction of the exercises carried out during the exercises in the computer room. The oral exam is passed if the candidate demonstrates to express himself clearly and use the correct terminology, to relate the parts of the program carried out and use the concepts acquired in a joint way to correctly answer the questions posed

Additional web pages

http://www.agr.unipi.it/piano-di-studio-programmi-3/

Updated: 03/09/2021 11:25