

Course title: MANAGEMENT OF AGROECOSYSTEMS

University: University of Buenos Aires, Argentina

Instructor: Eng. Agr. M. Dr. Sc Cs. Elba de la Fuente

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Academic Staff

– Golluscio Rodolfo, Eng. Agr. M. Dr. Sc Cs., Associate Professor of Forrajicultura (Culture Fodder). Ecology of grasslands and savannas. Analysis of regional heterogeneity and global changes.

Naomi – Mazzi, Eng. Agr. M. Dr. Sc Cs., Head of Practical Forestry of the Department of Forest ecology.

– Claudia Morvillo, Eng. Agr., PhD student. First Assistant of Industrial Crops Lecture. Crop-weed interactions. Plants producing secondary metabolites.

Invited Professor: – Diego Ferraro, Agr., Dr. Cs. Agr., Head of Field Work of Cerealicultura (Cultural Cereal). Sustainability.

Language of instruction: English

Audience: Open to foreign and Argentinean graduated and undergraduate students.

Contact hours: 45

General course description

The classes will be based on dynamic interactions between the professors and students, and will be heavily based on the discussion of issues raised in selected publications and teaching aids prepared by professors of the course.

Individual exercises to be resolved by the students will be completed for nearly all of the subjects, which will be a complement of the issues discussed in each class. In addition, there will be small working groups that will analyze energy flows in a gradient of agroecosystems with varying degrees of intensification.

A visit to field sites within the period of the course will integrate the knowledge gained through the analysis and solution of concrete situations in Pampean agroecosystems.

Objectives

In this course, students will learn the conceptual framework of the structure and functioning of agro-ecosystems that could serve as a basis for sustainable management.

The students will study the scientific and technological foundations of agricultural production and discuss the environmental consequences of agricultural practices in temperate ecosystems as a step forward in developing key criteria for the design and implementation of sustainable production technologies.

CONTENTS PER UNIT

- Agriculture in Argentina and the World.

Demand of agricultural products, population and economic growth. Supply of agricultural products, variations in extension and in productivity. Use of the energy at the agroecosystems. Environmental and technological constraints. Environmental problems.

- Key concepts of agroecosystems.

Definition, structure and functioning of agroecosystems. Differences between natural ecosystems and agroecosystems. Hierarchies, levels of organization and decisionmaking, properties. Energy flow in agroecosystems.

- Functional basis for the sustainable management of agroecosystems.

Ecophysiology of crops: ontogenetic cycle and generation of performance. Factors which regulate the development of crops. Ecophysiological basis of the production of the dry matter and the yield of crops. Ecophysiology of woody species. Forest systems: General aspects of its function. Structure of native and cultivated forests. Productivity. Ecophysiology of grasslands and pastures. Relationship between environmental factors and the development and growth of pastures and grasslands which determinate the performance and identification of the critical stages of their formation.

- Management of agroecosystems.

Spatial and temporal design of agroecosystems. Production technologies: functional basis for the management of water, nutrients, structure (criteria for the choice of planting date for the density and for the genotype) and adversity (weeds, pests and diseases). Overview of management of cultivated and native forests. Multiple production systems, agroforestry and pasture. Production technologies of pasture and rangeland. Scientific and technological basis of the proposals of pasture production and pasture.

TEACHING METHODOLOGY

The use of teaching-learning method responds to a lead-technique of study/work. The dynamic of the class is strongly based on the discussion of issues raised in selected publications and teaching aids prepared by professors of the course. In this scheme of work is a prerequisite to read the booklet provided by the professor before each class.

In almost every issue will take place the application of individual exercises which are related to the points discussed in each class. There will also be group work based on the analysis and discussion of situations which have to be submitted in both written and oral presentations.

A field work within the period of the course integrates the knowledge gained through the analysis and resolution of specific situations on agro ecosystems.

ASSESSMENT METHODS

The course consists of theoretical and practical lectures (pre-reading discussion and resolution activities), of an integrative group work and also consists of travelling to the ecosystems. The group work will be submitted in written form by each working group and must be defended in a mandatory oral presentation for all students after the course. The

assessment of course work will be based on the writing of individual and group assignments, and students oral presentations and participation in group activities. Students are required a minimum of 75 % attendance at practical classes and field trips.