

## Course guide

### 390347 - AGROE - Agroecology

**Last modified:** 06/06/2023

**Unit in charge:** Barcelona School of Agri-Food and Biosystems Engineering  
**Teaching unit:** 745 - DEAB - Department of Agri-Food Engineering and Biotechnology.

**Degree:** BACHELOR'S DEGREE IN AGRICULTURAL ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN AGRICULTURAL, ENVIRONMENTAL AND LANDSCAPE ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN AGRONOMIC SCIENCE ENGINEERING (Syllabus 2018). (Optional subject).

**Academic year:** 2023    **ECTS Credits:** 6.0    **Languages:** Catalan

#### LECTURER

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**Coordinating lecturer:** Antoni M. Verdú

**Others:** Mas Serra, Maria Teresa

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

CE-CA-21PA. (ENG) Tecnologías de la producción vegetal.  
Sistemas de producción y explotación. Protección de cultivos contra plagas y enfermedades. Tecnología de sistemas de cultivo de especies herbáceas- Agroenergética-

CE-CA-15. (ENG) Ecología. Estudio de impacto ambiental: evaluación y corrección

**Transversal:**

CT2. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.

#### TEACHING METHODOLOGY

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Learning hours consist of:

- theoretical classes
- seminars with a teacher-oriented work after recommending first and then reading different bibliographic documents
- visit to a farm
- desktop work in small group

#### LEARNING OBJECTIVES OF THE SUBJECT

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To understand the principles of ecology, how they help us to understand the concept of the agroecosystem and to analyze the sustainability of farming systems using ecology as a lens

Be able to use and apply basic terms of ecology in natural and agricultural ecosystems

Analyze ecosystem functions and explore different examples of the dynamic processes occurring within ecosystems

Understand how these processes are manipulated in an agroecosystem

Evaluate the importance of resistance and resilience in the sustainability of an ecosystem, and identify resilient components of your agroecosystem

Apply your understanding of your agroecosystem to the context of the global food system

## STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours large group	40,0	26.67
Hours small group	20,0	13.33

**Total learning time:** 150 h

## CONTENTS

### ECOSYSTEMS AND AGROECOSYSTEMS. ABIOTIC AND BIOTIC COMPONENTS OF THE AGROECOSYSTEM

#### Description:

In this content Agroecology is presented as a scientific discipline, although it has several dimensions. It will be present a brief history of the Agroecology. The main characteristics of the agroecosystems as particular ecosystems will be explained. The aim is to briefly review the environmental factors in the agroecosystems (crops, livestock and mixed systems), both abiotic factors (radiation, humidity, temperature, pH, ...) and biotic factors (organisms present in the soil, flora associated with the crops, fauna that interacts with the cultivated plants and the animals present on the farm).

#### Related activities:

Activity 1

Activity 2

#### Full-or-part-time: 18h

Theory classes: 9h

Self study : 9h

### PATTERNS AND PROCESSES IN AGROECOSYSTEMS

#### Description:

This content will address the most important concepts in ecological theory, both at the population and community levels: allocation of resources, carrying capacity, dispersion, biodiversity and ecological diversity, biotic interactions, food webs, succession, energy flows and circulation of nutrients,...

#### Related activities:

Activity 1

Activity 2

Activities 5 and 6

#### Full-or-part-time: 34h

Theory classes: 14h

Self study : 20h

### AGROECOLOGY AND LANDSCAPE

**Description:**

This content will address the interconnection of ecosystems (farms, semi-naturals and naturals) that make up the landscape. Some important aspects of landscape ecology and its relevance to agriculture and livestock will be considered.

**Related activities:**

Activity 1  
Activity 3  
Activity 4  
Activities 5 and 6

**Full-or-part-time:** 8h

Theory classes: 3h

Self study : 5h

### AGROECOLOGY AND AGROECOSYSTEMS MANAGEMENT. ECOSYSTEM SERVICES ASSOCIATED WITH AGRICULTURE AND LIVESTOCK

**Description:**

This content will present some technologies that allow us to examine how ecological concepts and principles can be useful to agricultural practice (intercropping, multispecies crops, crop rotation, cover crops, floral bands, use of field margins, management of invasive plants, grasslands,...), and particularly in the management and the impact on the diversity.

Besides, the concept of ecosystem service will be worked on. Ecosystem services or "benefits that humans derive from ecosystems" related to agricultural and / or ranching operations, their relative importance with respect to other "inputs" that farm requires, and the convenience of their sustainability (see transversal competence).

**Related activities:**

Activity 1  
Activity 3  
Activity 4  
Activities 5 and 6

**Full-or-part-time:** 85h

Theory classes: 10h

Practical classes: 20h

Self study : 55h

## ACTIVITIES

### ACTIVITY 1. CLASSES OF THEORETICAL EXPLANATION AND SEMINARS

**Description:**

Master classes will be held alternating with seminars (where an objective will be formulated, specialized bibliography will be provided in the form of scientific articles, time will be left for the search of information and an expository session will be held by the students).

**Material:**

Bibliographic material (books, scientific articles and links to specialized websites)

**Full-or-part-time:** 36h

Theory classes: 36h

### ACTIVITIES 2 and 3. WRITTEN EVALUATION TESTS

**Description:**

Two individual written tests will be carried out, one on contents 1, and 2; and the other on contents 3 and 4

**Specific objectives:**

Assess the achievement of the learning objectives of the subject acquired by the student

**Material:**

copy of written exam

**Delivery:**

Resolutions of the two tests. They represent each 30% (both 60%) of the final mark of the subject

**Full-or-part-time:** 4h

Theory classes: 4h

### ACTIVITY 4. VISIT TO A FARM

**Description:**

Students will make a proposal to visit a farm (in groups of a maximum of 3 people). Once accepted the proposal by the teaching staff the students will take it.

**Specific objectives:**

At the end of the activity the student will be able to:

Describe a chosen technology indicating the ecological bases identified

Characterize from the agro-ecological focus (use of indicators) the visited farm to assess its resilience

Place the farm in the landscape mosaic set in which it is located

**Material:**

The students will elaborate a scheme (with a questionnaire) of work that will be supervised by the teaching staff and will serve for the visit and the obtaining of the necessary data for the accomplishment of the activities 5 and 6.

**Full-or-part-time:** 5h

Laboratory classes: 5h

### ACTIVITY 5. OFFICE WORK AND ORAL EXPOSURE - 1

**Description:**

From the elaboration of the data obtained in the visit to a farm, the students will elaborate a report (with delivery of a document) and make a brief oral presentation on the "know-how" of the selected agricultural / livestock technology, focusing on in the aspects related to the ecological bases that support it.

**Specific objectives:**

Detect and analyze the ecological bases that sustain the technology selected by the student.

**Material:**

Script for the preparation of a written report.

**Delivery:**

Report that weighs, together with the assessment of the oral presentation, 15% of the global evaluation of the subject

**Full-or-part-time:** 5h

Laboratory classes: 5h

## ACTIVITY 6. OFFICE WORK AND ORAL EXPOSURE - 2

### Description:

From the elaboration of the data obtained in the visit to a farm, the students will elaborate a report (with presentation of a report) and they will make a brief oral presentation to present the evaluation of the resilience of the exploitation.

### Specific objectives:

Evaluate the resilience of the operation by using indicators based on the data obtained during the visit.  
Propose a plan to improve the farm from the agroecological perspective.

### Material:

Script for the preparation of a written report.

### Delivery:

Report that weighs, together with the assessment of the oral presentation, 25% of the global evaluation of the subject

### Full-or-part-time: 10h

Laboratory classes: 10h

## GRADING SYSTEM

The final qualification of the subject (Nfinal) will be the weighting of the different tests and evaluated works:

N1: qualification of the first evaluation test (contents 1 i 2).

N2: qualification of the second evaluation test (contents 3 i 4).

N3: qualification of the the report and of the oral presentation on the "know how" of an agriculture / livestock technology evaluated once a farm has been visited (activity 5).

N4: qualification of the report and of the oral presentation on the evaluation of the resilience of a visited farm (activity 6).

$$N_{\text{final}} = 0.3 N1 + 0.3 N2 + 0.15 N3 + 0.25 N4$$

## BIBLIOGRAPHY

### Basic:

- Martin, Konrad; Sauerborn, Joachim. Agroecology. Ed. Springer, cop. 2013. ISBN 9789400759169.
- Tivy, Joy. Agricultural ecology. Reimpr. New York: Longman Scientific & Technical : John Wiley & sons, 1991. ISBN 0582301637.
- Gliessman, Stephen R; Engles, Eric W. Field and laboratory investigations in agroecology. Boca Raton [etc.]: Lewis Publishers, cop. 2000. ISBN 1566704456.
- Gliessman, Stephen R. Agroecology : ecological processes in sustainable agriculture. Chelsea: Ann Arbor Press, cop. 1998. ISBN 1575040433.
- Gliessman, Stephen R. Agroecology : ecological processes in sustainable agriculture. Chelsea: Ann Arbor Press, cop. 1998. ISBN 1575040433.
- Gliessman, Stephen R; Engles, Eric W. Agroecology : the ecology of sustainable food systems. 3rd ed. Boca Raton, FL: CRC Press, 2015. ISBN 9781439895610.
- Altieri, Miguel A; Farrell, John G. Agroecology : the science of sustainable agriculture. 2nd ed. London: IT Publications, 1995. ISBN 1853392952.

### Complementary:

- Krishna, K.R. Agroecosystems: soils, climate, crops, nutrient dynamics and productivity. Oakville: Ed. Apple Academic Press, 2014. ISBN 9781926895482.
- Ryszkowski, Lech. Landscape ecology in agroecosystems management. Boca Raton, Florida [etc.]: CRC, cop. 2002. ISBN 0849309190.

## RESOURCES

### Other resources:

web site url

<https://agroeco.org/> />