

Course guide

390106 - CT - Earth Sciences

Last modified: 20/06/2023

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 BIOSYSTEMS ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN FOOD ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN AGRONOMIC SCIENCE ENGINEERING (Syllabus 2018). (Compulsory subject).

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

LECTURER

Coordinating lecturer: Gras Moreu, Anna

Others: Segon quadrimestre:
ANNA GRAS MOREU - Grup: 2A1, Grup: 2A2, Grup: 2A3, Grup: 2B1, Grup: 2B2, Grup: 2B3,
Grup: 2C1, Grup: 2C2

Blade Hernandez, Maria Del Carmen
Casals Missio, Joan
Llop Casamada, Jordi

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

2. Fundamentals of geology and land morphology and ability to apply them in problems related to engineering. Climatology.

Transversal:

1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.

TEACHING METHODOLOGY

The hours of learning aimed consist, firstly, to lectures (large group) in which teachers made a exhibition to introduce the learning objectives related to general concepts of the matter, trying to motivate and involve the students to participate actively in their learning. Athenea and other support material is used. Also, they are classes of problems and case studies of agri-environmental themes where students work in groups.

Before conducting the practices, students must have made a reading of the scripts and the material that teachers have prepared so that students know the objectives. In general, after each meeting tasks outside the classroom, that should work either individually or in groups, are proposed. They are the basis of the activities conducted.

These activities of small groups evaluate the efficacy of oral communication of students in two periods (one initial target and another student advanced course to assess progress in this competition).

We must also consider other hours of independent learning such as those engaged in directed readings, problem solving proposed questionnaires or self-learning content using different virtual campus ATENEA or other support.

LEARNING OBJECTIVES OF THE SUBJECT

It is intended that the student with a scientific view of the overall importance of lithological material, morphology of the terrain, soil and climate as factors limiting food production and land management.

You will be able to acquire the basic terms of agroclimatologia own, geomorphology, lithology, mineralogy and the soils and understand the main physical and chemical properties of soil and water relations of soil-plant-atmosphere. This has allowed them to evaluate the status and problems of the variables related to the edaphic environment, climate and relief, and use them in the resolution of appropriate cases to the practice of agricultural sciences.



STUDY LOAD

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

Total learning time: 150 h

CONTENTS

INTRODUCTION TO THE ATMOSPHERE PLANT, SOIL, ROCK SYSTEM

Description:

Introduction to the subject:

Components of terrestrial ecosystems and their influence on the life of man.

Influence of climate.

General functions of soils

Related activities:

Activity 1: Class of theoretical explanation.

Activity 2: Individual final assessment test

Full-or-part-time: 3h

Theory classes: 2h

Self study : 1h

ATMOSPHERE AND AGROCLIMATIC VARIABLES

Description:

Effect of climate and weather on agricultural production.

Composition and structure of the atmosphere.

Solar and terrestrial radiation and energy balance. Heat and temperature. Water and atmosphere.

Other atmospheric variables (air pressure, wind, ...)

Related activities:

Activity 1: Class of theoretical explanation.

Activity 2: Individual final assessment test

Activity 3: Problems and exercises with meteorological variables

Activity 5: Estimation of evapotranspiration

Activity 8: Questionnaires on paper and / or Moodle

Full-or-part-time: 30h 40m

Theory classes: 9h

Laboratory classes: 4h

Self study : 17h 40m

CLIMATE CLASSIFICATIONS

Description:

The criteria necessary to perform a classification climate
Major indices and weather charts
Major climatic classifications

Related activities:

Activity 1: Class of theoretical explanation
Activity 2: Individual final assessment test
Activity 5: Climatic Classifications
Activity 8: Questionnaires on paper and / or Moodle

Full-or-part-time: 19h

Theory classes: 4h
Laboratory classes: 4h
Self study : 11h

GEOLOGY AND MORPHOLOGY OF LAND

Description:

Description of the main types of minerals and rocks. Important minerals in soils and its main functions.
Study of the rocks of the Mediterranean. Alteration of rocks and soil formation processes.
Importance of physiography and forms of relief.
Effects of original material in soils: granulometry and texture, nutrients, color.

Related activities:

Activity 1: Class of theoretical explanation.
Activity 2: Individual final assessment test
Activity 5: Solving problems and case study of Geology and soils.
Activity 6: Laboratory Activities
Activity 7: Questionnaires on paper and / or Moodle

Full-or-part-time: 38h

Theory classes: 5h
Laboratory classes: 6h
Self study : 27h

SOIL SCIENCE

Description:

Morphology and soil components.
Organic components. Biogeochemical cycles.
Structure. Density. Porosity.
Soil Water. Soil solution.
Ion exchange. CIC. Cation exchange. Sodicitat. Soil pH.

Related activities:

Activity 1: Class of theoretical explanation.
Activity 2: Individual final assessment test.
Activity 5: Solving problems and case study of Geology and soils.
Activity 6: Laboratory Activities
Activity 7: Questionnaires on paper and / or Moodle

Full-or-part-time: 59h 20m

Theory classes: 20h

Laboratory classes: 6h

Self study : 33h 20m

ACTIVITIES

(ENG) ACTIVITY 1: THEORY LESSONS

Description:

Theoretical explanation class

Full-or-part-time: 82h

Theory classes: 38h

Self study: 44h

(ENG) ACTIVITY 2: FINAL INDIVIDUAL TESTS

Description:

Individual evaluation in the classroom about the indispensable theoretical concepts. Resolution of exercises related to the subject learning objectives. The evaluation will be corrected by teachers

Specific objectives:

To assess if the students reach the learning objectives of the subject as well as the specific competences

Material:

Statements of the two parts. Standard tables or classifications.

Delivery:

Test resolution. It represents 75% of the final mark of the subject.

Full-or-part-time: 2h

Theory classes: 2h

(ENG) ACTIVITY 3: PROBLEMS AND EXERCICES USING METEOROLOGICAL VARIABLES

Description:

Two two-hour classroom sessions. Students will solve exercises about solar radiation, energy balance of the Earth, and water content in the atmosphere. The students will solve a brief questionnaire related to the basic concepts at the beginning of the session. The students will work individually on the proposed exercises and they must be delivered to the teacher at the end of the session.

Specific objectives:

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

- carry out energy balances
- relate the different parameters involved in the atmospheric water vapor content

Material:

Dossiers of theoretical and practical classes will be made by the teacher. They will be available at ATENEA

Delivery:

Each student will deliver the questionnaire at the time indicated by the teacher. Students must submit the exercises to the teacher at the end of the activity. Class attendance will be controlled and the student participation and exercises delivered will be valued.

Full-or-part-time: 10h

Laboratory classes: 4h

Self study: 6h

(ENG) ACTIVITY 4: ESTIMATION OF EVAPOTRANSPIRATION - CLIMATOLOGIC CLASSIFICATIONS

Description:

Two sessions of two-hour classroom lessons. The students will work individually exercises about reference evapotranspiration and climatic classifications. At the beginning of the sessions students must answer a brief questionnaire related to the basic concepts. The students will work different exercises, which will be delivered to the teacher at the end of the session.

Specific objectives:

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

- determine reference evapotranspiration
- know how to do a climate classification

Material:

Dossiers of theoretical and practical classes will be provide by the teacher. They will be available at ATENEA.

Delivery:

Students must answer the questionnaire at the moment indicated by the teacher. At the end of the activity they will have to deliver the proposed exercises. The teacher will control attendance. Student participation and the resolution of the exercises will be valued.

Full-or-part-time: 13h

Laboratory classes: 4h

Self study: 9h

(ENG) ACTIVITY 5: RESOLUTION OF PROBLEMS OF GEOLOGY AND EDAFOLOGY

Description:

The teaching methodology used will be expositive and participative. Different exercises will be solved. Some aspects about geology and morphology of an area will be treated as well as description and classification of soils.

Specific objectives:

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

- calculate basic parameters of the physical characteristics of the soils (texture, porosity, bulk density)
- quantify the soil water content, using the standard nomenclature
- relate the energy states of the soil water with its practical application

Material:

Some exercises will be solved during the activity. They will have to be delivered to the teacher. Topic notes will be found at ATENEA. A guideline will be done.

Delivery:

The solved exercises and the cases proposed must be individually delivered to the teacher. After correcting they will be returned.

Full-or-part-time: 25h

Laboratory classes: 8h

Self study: 17h

(ENG) ACTIVITY 6: LABORATORY

Description:

The activity is done in the laboratory. It is about geology and soil science. Before carrying out the practice, the students must have done a previous reading of the guideline and the documents that the teacher has prepared. The students must have answer the corresponding report than includes specific questions, the results obtained in the practical activity and an evaluation of them.

Specific objectives:

At the end of the sessions the student should be able to:

- Identify characteristics of solid components of the soil
- Characterize chemical properties of soils
- Understand the results obtained

Material:

All the material and reagents necessary for the activity.

A detailed guideline, the report and notes of the subject will be available at ATENEA

Delivery:

The teacher will verify the activity results at the end of the session and they will be returned to the students with the corresponding feedback. The oral expression capacity of the students will be evaluated through an oral presentation of the results or some subject related to the activity.

Full-or-part-time: 15h

Laboratory classes: 4h

Self study: 11h

(ENG) ACTIVITY 7: TESTS

Description:

Questionnaires made in paper or in the digital campus on the contents 2, 3, 4 and 5. They will be corrected by teachers

Specific objectives:

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

- know the basic concepts on lithology, morphology of the land, the edaphic environment and climatology
- apply this knowledge to practical cases

Material:

Self-study test series with multiple options and subject notes will be available at ATENEA. Basic and specific bibliography of the contents of the subject.

Delivery:

The answered questionnaire. Its qualification participates in the continuous assessment process.

Full-or-part-time: 3h

Self study: 3h

GRADING SYSTEM

N1: Qualification assessment testing: Weight of each part of the program: 2/3 correspond to Geology and Soil Science and 1/3 corresponds to climatology. This note will be reached between the partial and final exam.

N2: Qualifications of the continuous assessment: Exercises and laboratory sessions related to Geology and Pedology: 2/3 of the percentage corresponding to practical sessions; Exercises of applied climatology: 1/3 of the percentage corresponding to practical sessions

$N_{\text{final}} = 0,75N1 + 0,25N2$

EXAMINATION RULES.

Practical activities are compulsory and the delivery of reports correctly answered is required to pass the course.

Reports must be submitted by the deadline

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