Course guides
390239 - BVP - Plant Biology

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 LANDSCAPE ARCHITECTURE (Syllabus 2019). (Compulsory subject).
Academic year: 2021  ECTS Credits: 6.0  Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: Gomez De Zamora Martinez, Daniel

Others:

PRIOR SKILLS

Anyone

REQUIREMENTS

Anything

DEGREE COMPETENCES TO WHICH THE SUBJECT CONtributes

Specific:
CE-PS-12. (ENG) Obtener las bases y fundamentos biológicos del ámbito vegetal en el paisaje.

Basic:
CB4. (ENG) Que los estudiantes puedan transmitir información, ideas, problemas y soluciones a un público tanto especializado como no especializado.

TEACHING METHODOLOGY

The hours of guided learning will consist on face-to-face sessions of one or two-hour where the used teaching methodology will be the masterclass and the participatory exhibition class, both in the sessions of theory (large group) as in the practices (small group). All this will take place with the help of the blackboard, oral Power-point presentations and computer activities. Practice sessions will have as an objective to complement and review the concepts seen in theory. The sessions will be hold at the laboratory and in the field.
The student will have support material related to the topics covered in the face-to-face sessions at the digital platform Atena, together with the masterclass presentations and other materials that may be of interest for the better understanding of the subject. The autonomous learning by the student will focus on reviewing the class notes and doing the activities that are explained in next paragraphs aimed to fixing the concepts seen in class.
In all activities, the student will have to follow the guidelines and deadlines that will be posted in Atena.
LEARNING OBJECTIVES OF THE SUBJECT

This course is intended to show the student that vegetation is the main element of the landscape and that is a changing entity with time that, although it can be manipulated to a certain extent, it has certain requirements that must be provided in order to persist with success in a particular place.

The student will be capable of:
1. Recognize the diversity of the vegetation.
2. Describe the morphology of the vascular plants, indicating the characteristics of their tissues and organs, as well as which are the adaptive responses of the plants to the environment.
3. Describe the basics of water, hydrocarbon and mineral nutrition of plants and the transport of substances through them, as well as which are the adaptive responses of plants to the environmental variations.
4. Describe the basics of the reproduction of the plants.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>40.0</td>
<td>26.67</td>
</tr>
<tr>
<td>Hours small group</td>
<td>20.0</td>
<td>13.33</td>
</tr>
<tr>
<td>Self study</td>
<td>90.0</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

Plant Morphology and systematics

Description:
1. Characteristics of the plant cell.
2. Plant tissues: types and features.
3. Structure and development of the organs of the plant: root, stem, leaf, flower and fruit.
4. Taxonomic categories
5. Main taxonomic groups: Bryophytes and ferns, Gymnosperms and Angiosperms

Specific objectives:
The student will be capable of:
1. List, describe and explain the functions of the plant organs.
2. List and describe the plant tissues.
3. Describe a plant cell.

Related activities:
Activity 1: Lecture.
Activity 2: Individual written test.
Activity 4: Herbarium.
Activity 5: Laboratory activities.
Activity 6: Field excursion.

Full-or-part-time: 65h
Theory classes: 16h
Laboratory classes: 8h
Guided activities: 2h
Self study: 39h
Plant Ecophysiology

Description:
1. Plant water nutrition.
   1.1. Absorption and transport of water in the plant.
   1.2. Transpiration and factors affecting transpiration.
   1.3. Plant adaptations to deficiency/excess of water in the environment.
2. Plant mineral nutrition.
   2.1. Mineral composition of the plants.
   2.2. Absorption and transport of ions in the plant.
   2.3. Plant adaptations to the deficiency/excess of mineral nutrients.
3. Plant hydrocarbon nutrition.
   3.1. Photosynthesis and factors that affect photosynthesis.
   3.2. Types of plants according to photosynthesis.
   3.3. Plant adaptation to light and temperature.
   4.1. Vital forms and phenology.
   4.2. The movement of plants: tropisms and nastias.

Specific objectives:
At the end of the course the student will be capable of:
1. Understand how the vegetables in interaction with the environment that surrounds them.
2. Recognize and characterize the different situations of stress that plants may suffer due to climatic, edaphic, anthropogenic and biotic factors.
3. Explain the plant response to tolerance, acclimatization and adaptation.
4. Recognize and interpret the different relationships that plants establish with other living organisms in their environment.
5. Understand and implement various methods and techniques used in ecophysiological studies.

Related activities:
Activity 1: Lecture.
Activity 2: Individual written test.
Activity 5: Laboratory activities.

Full-or-part-time: 37h
Theory classes: 12h
Laboratory classes: 8h
Guided activities: 15h
Self study: 2h
Geography of plants

Description:
1. Corology of plants
2. Geobotany. Biomes

Specific objectives:
At the end of the course the student will be able to:
1. Understand the global factors, dynamics and processes that determine the distribution of biomes on the planet.
2. Recognize and characterize the vegetation associated with terrestrial biomes.
3. Understand and describe the environmental factors that determine the distribution of flora species.
4. Understand and link plant adaptations to the environmental conditions of the different biomes.
5. Recognize and interpret the different relationships that plants establish with other living organisms in their environment.

Related activities:
Activity 1: Lecture.
Activity 2: Individual written test.
Activity 4: Herbarium.
Activity 5: Laboratory activities.
Activity 6: Field excursion.

Full-or-part-time: 48h
Theory classes: 12h
Laboratory classes: 4h
Guided activities: 2h
Self study: 30h

ACTIVITIES

Description:
Sessions of 1 and 2-hour length are given, in which the contents of each thematic unit is explained.

Specific objectives:
Through this activity, the student will achieve minimum knowledge and understanding of the contents worked at class

Material:
The presentations of the master classes are available on ATENEA, as well as supplementary files for each theme.
At the beginning of each block, specific and general bibliography of each topic will be provided.

Full-or-part-time: 87h
Theory classes: 38h
Self study: 49h
Individual test

Description:
Individual test of 2 hours duration on the theoretical and practical concepts taught and developed throughout the course.

Specific objectives:
To assess the degree of scope by the student of the objectives as well as the specific competencies associated.

Material:
Written test. Calculator, if needed.

Delivery:
Sheet with answers.

Full-or-part-time: 2h
Theory classes: 2h

Questionnaire of autonomous learning in Moodle.

Description:
Resolution of questionnaires through ATENE A when a topic comes to an end. It is an individual activity to be performed with a computer connected to ATENA in which the student will have a certain time to answer few questions related with the topic. Each question has several options. The student can consult any document or medium (written, Internet, book, etc.) available. The activity will be opened in Athena after the end of a topic and it will be available for a week. There will only be an attempt. Once finished or when the time available is over, it is send and corrected automatically (except for open-ended questions)

Specific objectives:
Review and work the contents given in class, answering a few brief questions. In order to reflect in the final grade of the course the time spent on this activity, the note of the questionnaires will be incorporated into the final note as a small percentage.

Material:
Self-learning test with multiple options available in ATENA.

Delivery:
The questionnaire is filled in online and it is sent automatically when it is finished or when the time is over.

Laboratory activities

Description:
A total of 8 sessions in the laboratory will be done to complement the theoretical concepts given in class. The practices will be made in pairs.

Specific objectives:
Fix and/or expand concepts already seen in class, working on fresh plant material.
Experimentally verify some biological processes and evaluate its outcome.

Material:
The material used in the practice will be available in the laboratory. In some practices the student may requested to bring specific material to work during practice. Each practice will have his guideline.

Delivery:
At the end of each practice a report will be handed in following the guidelines of the teacher; if the report was not finished, it could be handed in at the beginning of the next practice. The report can be done in pairs and it will be scored.

Full-or-part-time: 28h
Laboratory classes: 18h
Self study: 10h
Field visit

Description:
A 2-hour walk will be done to study the vegetation of the campus.

Specific objectives:
The student will observe and identify in natural conditions plant biology concepts explained in class.

Material:
Notes from class and guideline of the walk with the items that the student must observe.

Delivery:
At the end of the field walk, a small report shall be delivered in pairs with the answers to the questions of the script's practices.

Full-or-part-time: 2h
Laboratory classes: 2h

Realization of a herbarium

Description:
The student will have to make a herbarium with a minimum of 30 different plants, 15 of which at most, could be cultivated (in agriculture or gardening).

Specific objectives:
To familiarize the student with the different ecosystems and landscapes, and with the plants that are associated to them. Identify our main plants around, associating them with a particular landscape.

Material:
The herbarium may consist of three types of material: plants that have been caught and pressed, photographs, drawings or a mix of the three things. In all cases, each individual will be correctly identified by its scientific name, common name, botanical family, pick up date, place, environment in which it is located (garden, wilderness, mountain, agricultural field, bed of river, etc.). The herbarium will be done outside of class hours.

Delivery:
The herbarium will be delivered, completed and bound, the day of the final exam.

Full-or-part-time: 25h
Self study: 25h

GRADING SYSTEM

The final note (N) will be established by:
\[ N = 0.60 \times \text{exam} + 0.25 \times \text{herbarium} + 0.15 \times \text{practices reports} \]
The written exam will have two parts (morphology + ecophysiology) that will represent each one the 50% of the note of the examination. These two parts can be done on separate days, i.e. the first on the dates fixed for the middle time exams and the other at the end of classes.
BIBLIOGRAPHY

Basic:

Complementary:

RESOURCES

Hyperlink:
- Intranet docent ATENEA. https://atenea.upc.edu/moodle/login/index