390107 - BV - Plant Biology

Coordinating unit: 390 - ESAB - Barcelona School of Agricultural Engineering
Teaching unit: 745 - EAB - Department of Agri-Food Engineering and Biotechnology
Academic year: 2018
Degree: BACHELOR'S DEGREE IN BIOSYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN AGRICULTURAL, ENVIRONMENTAL AND LANDSCAPE ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN FOOD ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN AGRICULTURAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN FOOD ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan

Teaching staff
Coordinator: Verdu Gonzalez, Antonio Maria

Others:
Mas Serra, Maria Teresa
Serrano Porta, Lidia
Mangas Alonso, Susana

Degree competences to which the subject contributes

Specific:
1. Identification and characterization of vegetal species.

Transversal:
3. EFFECTIVE USE OF INFORMATION RESOURCES - Level 2. Designing and executing a good strategy for advanced searches using specialized information resources, once the various parts of an academic document have been identified and bibliographical references provided. Choosing suitable information based on its relevance and quality.
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Teaching methodology

The hours of directed learning consist:
- Theoretical classes (large group), the teacher makes an exhibition of three parts: (1) introduce the learning objectives, (2) present the basic concepts (3) search for the implication of students from one or more questions in order to relate these concepts.
- Practical classes (small group) to encourage students to carry out activities that ar proposed and described in the scripts of practices, in order to learn various methodologies involved in Plant Biology.
- Guiding students in the elaboration of deliverable work of bibliographic research, in order to recognize and consult the information sources to perform specific work, as well as support for the realization and synthesis of experimental results work.

The student has support material (such as diagrams and photographs to support the theory classes, issue papers, the script of practical references to complementary readings, link to thematic Internet pages, etc.) to ATENEA. It also promotes independent learning, particularly through the deliverable work and through the interaction that is looking for at the theoretical classes.

Learning objectives of the subject

After Vegetal Biology subject, the student should be able to:
- Understand the general life cycle of plants with seed and recognize the main morphological features.
- Assimilate the system of determination of seed plants and know the major groups of plants with ethnobitanical and economic interest.
- Understand the basics of nutrition and transport in higher plants and know their impact on plant production.
- Understand the processes that comprise the plant development and its hormonal control and identify the main applications in the area of artificial regulation.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 40h</th>
<th>26.67%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group: 20h</td>
<td>13.33%</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>

Theoretical classes (large group), the teacher makes an exhibition of three parts: (1) introduce the learning objectives, (2) present the basic concepts (3) search for the implication of students from one or more questions in order to relate these concepts.

Practical classes (small group) to encourage students to carry out activities that are proposed and described in the scripts of practices, in order to learn various methodologies involved in Plant Biology.

Guiding students in the elaboration of deliverable work of bibliographic research, in order to recognize and consult the information sources to perform specific work, as well as support for the realization and synthesis of experimental results work.

The student has support material (such as diagrams and photographs to support the theory classes, issue papers, the script of practical references to complementary readings, link to thematic Internet pages, etc.) to ATENEA. It also promotes independent learning, particularly through the deliverable work and through the interaction that is looking for at the theoretical classes.
### Content

<table>
<thead>
<tr>
<th>ANATOMY AND MORPHOLOGY OF CORM</th>
<th>Learning time: 32h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
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<tr>
<td></td>
<td>Guided activities: 1h</td>
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<tr>
<td></td>
<td>Self study: 25h</td>
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</tbody>
</table>

**Description:**
In this theme are studied plants as complex creatures with a vegetative development which, although follows common guidelines can lead to morphologies and diverse lifestyles. It works:
- Tissue systems
- The embryonic organs, primary and secondary growth.
- The anatomy and morphology of roots, stems and functional leaves, emphasizing those tissues or organs that can present interesting changes in agricultural production and in the vegetative propagation.

**Related activities:**
Activity 1: Theory classes
Activity 2: Individual test content 1, 2 and 3
Activity 4: Bibliographic research content 1

<table>
<thead>
<tr>
<th>BIOLOGY OF REPRODUCTION OF PLANTS</th>
<th>Learning time: 20h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 10h</td>
</tr>
<tr>
<td></td>
<td>Self study: 10h</td>
</tr>
</tbody>
</table>

**Description:**
This content is devoted to the biology of reproduction. It works:
- The types of life cycles
- Flowers and inflorescences. Formation of male and female gametes.
- Pollination, fecundation, embryo development, seed and fruit formation.
- Types of fruits. Dispersal of fruits and seeds.
- Germination and epigea hipogea.

**Related activities:**
Activity 1: Theory classes
Activity 2: Individual test
<table>
<thead>
<tr>
<th>DIVERSITY OF PLANTS, IDENTIFICATION AND DETERMINATION</th>
<th>Learning time: 23h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 3h</td>
<td>Self study : 10h</td>
</tr>
<tr>
<td>Laboratory classes: 10h</td>
<td></td>
</tr>
</tbody>
</table>

**Description:**
- The diversity in the morphology of the reproductive organs (flowers and fruits).
- The relationship between the morphology of the reproductive organs and the taxonomic position of species. The relationship between taxonomy and phylogeny.
- The characteristics of the main groups of plants of economic and ethnobotanical interest.

**Related activities:**
- Activity 1: Theory classes
- Activity 2: Individual test
- Activity 5: Laboratory
- Activity 6: Individual continued assessment test in laboratory.

<table>
<thead>
<tr>
<th>TRANSPORTATION AND TRANSLOCATION OF WATER AND SOLUTES</th>
<th>Learning time: 28h</th>
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<tbody>
<tr>
<td>Theory classes: 7h</td>
<td>Self study : 16h</td>
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<tr>
<td>Laboratory classes: 5h</td>
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</table>

**Description:**
In this theme are studied water and mineral nutrition of higher plants, emphasizing the key role of the root-soil interface in the context of the system SPAC (soil-plant-atmosphere continuum). It works:
- Water the plants.
- Transpiration and stomatal control.
- Nutrients and symptoms of nutritional deficiency.
- Absorption and transport of nutrients.
- Stem transport

**Related activities:**
- Activity 1: Theory classes
- Activity 3: Individual test
- Activity 7: Research work
- Activity 8: Laboratory
### PLANT BIOCHEMISTRY AND METABOLISM

**Learning time:** 20h  
- Theory classes: 7h  
- Self study: 13h  

**Description:**  
The content focuses on the study of hydrocarbonated nutrition and metabolism of higher plants, to understand, together with the content, the bases of atrophy plant and its involvement in the food web. It works:  
- Photochemical phase of photosynthesis.  
- Biochemical phase of photosynthesis.  
- Plant respiration.  
- The limiting factors and agronomic and ecological aspects of photosynthesis.  
- Phloem transport and delivery of assimilated.  
- Assimilation of nitrogen and sulfur  

**Related activities:**  
- Activity 1: Theory classes  
- Activity 3: Individual test  
- Activity 7: Research work

### PLANT DEVELOPMENT

**Learning time:** 27h  
- Theory classes: 6h  
- Laboratory classes: 5h  
- Self study: 16h  

**Description:**  
In this content it points out the basic concept of growth, cell differentiation and morphogenesis as structural elements in the development of higher plants, and studies the major internal and external regulatory elements of the processes of plant development.  
It works:  
- Plant development and regulation endogenous and exogenous.  
- Photomorphogenic and light as a regulator of plant development.  
- Hormones plant.  
- Control of flowering and fruit development and seed.  
- Life at rest.  
- Senescence and abscission.  

**Related activities:**  
- Activity 1: Theory classes  
- Activity 3: Individual test  
- Activity 7: Research work  
- Activity 8: Laboratory  
- Activity 9: Preparation and delivery practices questionnaire.
## Planning of activities

<table>
<thead>
<tr>
<th>Activity Description</th>
<th>Hours</th>
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<tbody>
<tr>
<td>(ENG) ACTIVITY 1. THEORY LESSONS</td>
<td>39h</td>
</tr>
<tr>
<td>Theory classes: 39h</td>
<td></td>
</tr>
<tr>
<td>(ENG) ACTIVITY 2. INDIVIDUAL TEST (CONTENTS 1,2 AND 3)</td>
<td>1h 30m</td>
</tr>
<tr>
<td>Theory classes: 1h 30m</td>
<td></td>
</tr>
<tr>
<td>(ENG) ACTIVITY 3. INDIVIDUAL TEST (CONTENTS 4,5 AND 6)</td>
<td>1h 30m</td>
</tr>
<tr>
<td>Theory classes: 1h 30m</td>
<td></td>
</tr>
<tr>
<td>(ENG) ACTIVITY 4. LITERATURE RESEARCH</td>
<td>16h</td>
</tr>
<tr>
<td>Guided activities: 1h</td>
<td></td>
</tr>
<tr>
<td>Self study: 15h</td>
<td></td>
</tr>
<tr>
<td>(ENG) ACTIVITY 5. LABORATORY</td>
<td>10h</td>
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<tr>
<td>Laboratory classes: 10h</td>
<td></td>
</tr>
<tr>
<td>(ENG) ACTIVITY 6: LABORATORY EVALUATION TESTS</td>
<td>1h</td>
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<tr>
<td>Laboratory classes: 1h</td>
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<tr>
<td>(ENG) ACTIVITY 7. LITERATURE RESEARCH</td>
<td>12h</td>
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<tr>
<td>Self study: 12h</td>
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<tr>
<td>(ENG) ACTIVITY 8. LABORATORY</td>
<td>14h</td>
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<tr>
<td>Laboratory classes: 14h</td>
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</tbody>
</table>
Qualification system

The final qualification of this subject, Nfinal, is calculated with the follow system:
N1: qualification of the writing test related to the contents 1 and 2.
N2: qualification of the writing test related to the contents 4, 5 and 6.
N3: qualification of the writing test related to the contents 3.
N4: deliverables qualification of the practices related to the contents 4, 5 and 6.
N5(CG): qualification of generic competition "use reliable of resources of information" related with the deliverable associated to the content 1 or with content 4, 5 and 6.

Nfinal = 0,3 N1 + 0,325 N2 + 0,175 N3+ 0,15 N4 + 0,05 N5(CG)

If you have failed the subject (final mark), you will be able to re-evaluate the contents of the course (1, 2, 3, 4, 5 and 6) corresponding to the qualifications N1, N2, N3, and N4 through a global writing exam.

Regulations for carrying out activities

It is a necessary condition to have presented all the documents related to the evaluation to pass the subject.
Bibliography

Basic:


Complementary:


Others resources:

Hyperlink

Botànica Agrícola i Forestal

http://botanicavirtual.udl.es
Histología vegetal
http://www.inea.uva.es/servicios/histologia/inicio_real.htm

Library of Crop Technology Lesson Modules
http://www.croptecnology.unl.edu