Course guide

390457 - GMG - Genomics and Breding

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). (Optional subject).
Academic year: 2022 ECTS Credits: 6.0 Languages: Catalan

LECTURER

Coordinating lecturer: Casals Missio, Joan
Others: Lozano Luis, Lidia Simó Cruanyes, Joan

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

Transversal:
04 COE. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.
06 URI. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

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STUDY LOAD

<table>
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<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hours large group</td>
<td>60.0</td>
<td>40.00</td>
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<tr>
<td>Self study</td>
<td>90.0</td>
<td>60.00</td>
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Total learning time: 150 h
## CONTENTS

### A. Principles of plant breeding

**Description:**

**Full-or-part-time:** 43h  
Theory classes: 11h  
Laboratory classes: 6h  
Self study: 26h

### B. Plant breeding methods

**Description:**
History of plant breeding, from phenotypic selection to biotech breeding. Plant genetic resources and germplasm banks. Plant breeding: autogamous, allogamous and asexually propagated crops.

**Full-or-part-time:** 39h  
Theory classes: 11h  
Laboratory classes: 4h  
Self study: 24h

### C. Methods to generate new variability and use of molecular markers in plant breeding programs

**Description:**
Techniques to generate variability: site-directed mutagenesis (Tilling, Ecotilling), somaclonal variation, polyploidization, transgenesis and cisgenesis, genome editing. Marker assisted selection: design of primers, development of molecular markers

**Full-or-part-time:** 33h  
Theory classes: 9h  
Laboratory classes: 4h  
Self study: 20h

### D. Genomics and epigenetics

**Description:**
DNA sequencing techniques, from Sanger technology to massive sequencing tools. Sequencing vs. resequencing. Bioinformatics. Databases and synteny studies. The -omics revolution, from phenomics to transcriptomics. Genomic applications for vegetable plant breeding: genome-wide association studies (GWAS) and genomic selectoon. Epigenetics.

**Full-or-part-time:** 35h  
Theory classes: 11h  
Laboratory classes: 4h  
Self study: 20h
**ACTIVITIES**

<table>
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| **Full-or-part-time:** 40h  
Theory classes: 40h |

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

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|**Full-or-part-time:** 4h  
Laboratory classes: 4h |

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|**Full-or-part-time:** 8h  
Laboratory classes: 8h |

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

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|**Full-or-part-time:** 4h  
Laboratory classes: 4h |

**GRADING SYSTEM**

**BIBLIOGRAPHY**

**Basic:**

**Complementary:**