

## Plant Genomics and System Biology

2015/2016

Code: 42880

ECTS Credits: 6

Degree	Type	Year	Semester
4313771 Plant Biology and Biotechnology	OB	0	1

### Contact

Name: David Caparros Ruíz

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### Use of languages

Principal working language: english (eng)

### External teachers

Amparo Monfort

Elena Monte

Juan José López Moya

Manuel Rodríguez Concepción

Maria Lois

Montse Martín

### Prerequisites

Basic knowledge of Genetics

### Objectives and Contextualisation

To provide students with a comprehensive and current view of the techniques, fundamentals and applications of Plant Genomics and introduce systems biology of plants. The specific objectives include understanding the following aspects: the diversity and complexity of plant genomes, the techniques commonly used in genomic studies and applications to the genetic improvement of crop plants. Introduction to Systems Biology of Plants.

### Skills

- Analyse research results to obtain new products or processes, assessing their industrial and commercial viability with a view to transferring them to society.
- Apply knowledge of plant molecular genetics to different areas of science and industry.
- Apply knowledge of the functional mechanisms of plants from the different organisational levels to the characterisation of processes of growth and development of the whole plant organism.
- Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
- Continue the learning process, to a large extent autonomously
- Develop critical reasoning within the subject area and in relation to the scientific or business context.
- Identify and use bioinformatic tools to study plant genetics, evolution and functioning.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Use and manage bibliography and IT resources in the field of study.

- Use scientific terminology to account for research results and convey these in spoken and written English in an international context.
- Use the research methodology of biology and plant biotechnology.

## Learning outcomes

1. Analyse research results to obtain new products or processes, assessing their industrial and commercial viability with a view to transferring them to society.
2. Apply knowledge of plant genetics and genomics to the functional study of crops.
3. Apply knowledge of plant genomics to the improvement of crops.
4. Apply systems biology models to the characterisation of complex functional processes in plants.
5. Apply the different tools habitually used in the sequencing, assembly and annotation of plant genomes and crop improvement.
6. Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
7. Continue the learning process, to a large extent autonomously
8. Describe and identify the different components present in plant genomes.
9. Develop critical reasoning within the subject area and in relation to the scientific or business context.
10. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
11. Use and manage bibliography and IT resources in the field of study.
12. Use scientific terminology to account for research results and convey these in spoken and written English in an international context.
13. Use techniques from systems biology in the genetic improvement of crops.

## Content

1 Plant Genome

2 Methods and techniques in plant genomics

3 Genetic improvement of crop plants : use of markers and importance of QTL

4 System Biology : Concepts and methodology of study (omics)

5 Importance of system biology to improve cultivated plants

6 Importance of transference University - Industry in Genomic Research and Systems

## Methodology

Lectures

Expert talks

Seminars

Problems and case studies

Preparation of reports

Personal study

## Activities

Title	Hours	ECTS	Learning outcomes
<b>Type: Directed</b>			
Expert talks	2	0.08	
Lectures	28	1.12	
<b>Type: Supervised</b>			
Problems/Case studies	15	0.6	
Seminars	15	0.6	
<b>Type: Autonomous</b>			
Personal study	60	2.4	
Preparation of reports and works	30	1.2	

## Evaluation

Continuous evaluation 40%

Reports and works 60%

## Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Active participation in class and seminars	40%	0	0	1, 4, 8, 9, 6, 7, 12
Reports and papers	60%	0	0	1, 2, 3, 5, 4, 8, 9, 10, 6, 7, 13, 11, 12

## Bibliography

Yunbi Xu Molecular Plant Breeding. CAB International Oxfordshire, UK disponible online a Biblioteca UAB :<http://www.cabi.org/cabebooks/FullTextPDF/2010/20103101750.pdf>

Articles and specific reviews recommended during classe