

Plant Genomics and System Biology

2014/2015

Code: 42880
ECTS Credits: 6

Degree	Type	Year	Semester
4313771 Biologia i Biotecnologia Vegetal	OB	0	1

Contact

Name: David Caparros Ruíz
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Use of languages

Principal working language: anglès (eng)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Maria Montserrat Martín Baranera
Amparo Monfort Vives
Juan Jose Lopez-Moya Gomez

External teachers

Manuel Rodríguez-Concepción
María Lois

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. Aplicar las diferentes herramientas utilizadas habitualmente en la secuenciación, ensamblaje y anotación de los genomas vegetales a la mejora de las plantas de cultivo
3. Aplicar los conocimientos de la genómica vegetal a la mejora de plantas de cultivo
4. Aplicar los conocimientos de la genética y genómica vegetal al estudio funcional de las plantas de cultivo
5. Aplicar modelos propios de la Biología de Sistemas a la caracterización de procesos funcionales complejos de las plantas
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. Describir e identificar los distintos componentes presentes en los genomas vegetales
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. Usar técnicas de la Biología de Sistemas en la mejora genética de las plantas de cultivo
12. Use and manage bibliography and IT resources in the field of study.
13. Use scientific terminology to account for research results and convey these in spoken and written English in an international context.

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 cas studies

Preparation of reports

Personal study

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Expert talks	2	0.08	
Lectures	28	1.12	
Type: Supervised			
Problems/Case studies	15	0.6	
Seminars	15	0.6	
Type: Autonomous			
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 ans seminars	40%	0	0	1, 5, 8, 9, 6, 7, 13
Reports and papers	60%	0	0	1, 4, 3, 2, 5, 8, 9, 10, 6, 7, 11, 12, 13

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