

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

Contact

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Other comments on languages

English used in lab and seminars

Use of languages

Principal working language: spanish (spa)

Teachers

Josep Allué Creus

Joan Barceló Coll

Prerequisites

Basic knowledge on Plant Physiology

Objectives and Contextualisation

Acquisition of an integrated view of the different levels of study (cellular, molecular, physiological, metabolic) in whole plants.

Skills

- Apply biotechnological cell-factory methods to plants and fungi in order to obtain new products.
- 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.
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Propose and analyse ad hoc solutions deriving from research with plants, in line with the situations and needs of each case.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
- 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.

Learning outcomes

1. Apply knowledge of secondary metabolism in plants to biotechnological uses in plant cell factories.
2. Choose and apply model plants for the study of functional mechanisms in plants.
3. Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
4. Describe the processes of growth and development regulation in plants and apply techniques to study these.
5. Identify metabolic and cytological stress markers in plants.
6. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
7. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
8. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
9. Use and manage bibliography and IT resources in the field of study.
10. Use scientific terminology to account for research results and convey these in spoken and written English in an international context.

Content

Richness and diversity of metabolism (primary and secondary)

Biotechnological uses of secondary metabolism products;

Plant cell cultures for the production of bioproducts

Mechanisms of regulation of plant development,

Systems of perception and transduction of signals inside plants indoor both under normal and environmental stress conditions.

Experimental Techniques in Plant Physiology and Metabolism

Phenotyping

Metabolomic Analysis

Stress indicators

-Cultivation of plants for experimentation techniques including in vitro (plant cells in suspension, callus, plant tissue cloning etc..) and its applications

Methodology

Lectures

Seminar

Laboratory practices

Consultation and analysis of articles and reports of interest

Personal study

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Laboratory practices	12	0.48	4, 5, 7, 2, 8, 9, 10
Lectures	28	1.12	1, 4, 5, 6, 2
Seminar	5	0.2	7, 3, 6, 2, 8, 9, 10

Type: Supervised				
Performance of reports and homework	60	2.4	1, 7, 6, 8, 9, 10	
Type: Autonomous				
Consultation and analysis of articles and reports of interest	40	1.6	1, 4, 5, 7, 6, 2, 8, 9	
Personal study	80	3.2	1, 4, 5, 7, 6, 2, 8, 9	

Evaluation

Continuous evaluation

Performance of practical work (25%)

Seminar (25%)

Attendance and active participation in class (25%)

Delivery of reports and homework (25%)

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Attendance and active participation in class	25%	0	0	1, 4, 5, 7, 3, 2, 9
Deliver reports and homework	25%	0	0	4, 7, 6, 2, 8, 9, 10
Lab Practical Work	25%	0	0	1, 4, 5, 7, 6, 2, 8, 10
Seminar	25%	0	0	1, 4, 7, 3, 6, 8, 9, 10

Bibliography

Bibliography

Barceló J, Nicolás G, Sabater B, Sanchez Tamés R (2009) Fisiología Vegetal. Piramide, Madrid

Buchanan B, Gruissem W, Jones R (2015) 2nd edition Biochemistry and Molecular Biology of Plants. ASPB

Jones, R, Oughan H, Thomas H, Waaland S (2012) The Molecular Life of Plants. Wiley-Blackwell, ASPB

Taiz L, Zeiger E, Moller IM, Murphy A (2015) Plant Physiology and development 6th edition. Sinauer Assoc. Inc. Publ.

- Annual Review of Plant Biology
- Frontiers in Plant Science
- Trends in Plant Science