COURSE DATA

Data Subject	
Code	33930
Name	Molecular Plant Biology
Cycle	Grade
ECTS Credits	4.5
Academic year	2019 - 2020

Study (s)

Degree	Center	Acad. year	Period
1102 - Degree in Biotechnology	Faculty of Biological Sciences	4	First term

Subject-matter

Degree	Subject-matter	Character
1102 - Degree in Biotechnology	113 - Plant molecular biology	Optional

Coordination

Name	Department
CARRASCO SORLI, PEDRO MIGUEL	30 - Biochemistry and Molecular Biology

SUMMARY

It is intended to provide the student with a molecular biotechnology and worldview of plants. To this end, basic skills are taught and the necessary molecular tools that allow them to form an integrated peculiarities of plants at the molecular level, both during development and in the responses of the same against the environment vision will be explained.
Students should acquire the knowledge necessary for an understanding of the subjects on the agenda, as well as the ability to discuss articles related.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

OUTCOMES

1102 - Degree in Biotechnology

- Capacidad de interpretar datos relevantes.
- Be able to convey ideas, problems and solutions in the field of biotechnology.
- Develop skills to undertake further study.
- Have abilities for teamwork and cooperation in multidisciplinary teams.
- Have abilities to disseminate and participate in the social debate on aspects related to biotechnology and its use.
- Be able to use English to write reports and to interpret information from protocols, manuals and databases.

LEARNING OUTCOMES

- Skill in handling basic literature sources related to the subject and ability to deepen their knowledge in a specific subject, to the plants, for the preparation of seminars.
- Understand and use the proper terminology for describing molecular processes in plants.
- Understanding the strategies of plants to organ development and responses to environmental or defense to pathogens changes.
- Capacity group work
- Adequate temporary organization
- Using new communication technologies
- Ability to prepare, present and discuss in public seminars
- Ability to experimental work, appropriate interaction with peers and teacher laboratory and development of the critical capacity of the experimental results.

DESCRIPTION OF CONTENTS

1. Secondary metabolism

Products derived from secondary metabolism: function in the plant. biosynthetic pathways of secondary metabolism. Manipulation of secondary metabolism: biotechnological applications.

2. Signal perception and transduction

Characteristics of signal transduction pathways. Receptors, intracellular intermediaries, sensors and effectors. Kinase systems hybrid of two components: ethylene and cytokinin receptors. Photomorphogenesis. Answers to far-red and red light: phytochrome. Responses to blue light and ultraviolet (Answers B / UV): phototropins and Cryptochromes. Other photoreceptors. Signaling movements and gravitropism fototropismo

. The signalosome and signal transduction by light. Signaling kinases like receptors.

3. Timing

The circadian clock. Biological clocks in plants. Components of circadian systems: molecular organization. Circadian regulation of growth. Interactions between plant hormones and the biological clock.

4. Floral development

The floral development in upper plants. Signals that induce the flowering. The floral development in Arabidopsis. Development of the organs of the flower. Incompatibility gametofítica and esporofítica. Development of the fruit. Fructificación. Maduration and senescencia. Manipulation of the reproduction.

5. Senescence and programmed cell death

Types of cell death. Cell death in the life cycle of plants. Senescence: metabolic alterations during senescence. Regulation of metabolic activity in senescent cells. Growth regulators and senescence. Cell death in response to the development and stress.

6. Molecular answers to abiotic stress or environmental stress

wWater deficit, salinity, oxidative stress. General mechanisms of response to abiotic stresses. Oxidative stress and the role of reactive oxygen species (ROS). Stress deficiency and excess metals.

7. Molecular interactions plant-pathogen

Molecular strategies pathogenic fungi, bacteria, viruses, invertebrates and herbivores. Biochemical aspects of defense. post-transcriptional silencing in virus defense. Plant-Agrobacterium.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	25,00	100
Laboratory practices	20,00	100
Attendance at events and external activities	3,00	0
Development of individual work	4,50	0
Study and independent work	30,00	0
Preparing lectures	30,00	0
TOTAL	**112,50**	

TEACHING METHODOLOGY

- Theoretical classes with no compulsory attendance
- Preparation of projects and their presentation in seminars
- Classes practicals with compulsory attendance

EVALUATION

An exam at the end of the semester will consist of issues related to the program content will be made. The test is scored on 7.5 points. It will be based on a number of issues, previously provided to the student. For the resolution of the issues the student will be based on class notes and a series of articles that will go forward as providing lectures. Likewise, practices score of 2.5, broken down as follows: 0.5 points will be assessed on the student's attitude during the test and two points a written test to be held simultaneously to the theory exam. Attendance at practices is mandatory, failing to pass the course, in any of his calls, the student who has not attended to them.
Exposing volunteer work may increase up to one point qualification exam.

REFERENCES

Basic

- Bibliografía General.
  Buchanan BB, Gruissen W, Jones R. (2015). Biochemistry and Molecular Biology of Plants 2nd Ed. American Society of Plant Biologists.
  Fosket, D.E..I., Mercier. (1994). Plant growth and development. A molecular approach. Academic Press. New York.
  Henry, R.J. Practical applications of plant molecular biology. Chapman and Hall (1997)
  Howell, S.H. Molecular genetics of plant development. Cambridge University Press. (1998).
  Hopkins WG (1999). Introduction to Plant Physiology. John Wiley and Son, Inc.
  Jones, R., Ougham, H., Thomas, H. and Waaland, S. (2013). The Molecular Life of Plants. Wiley-Blackwell

Lea, P.J. and R.C. Leegood (1999). Plant Biochemistry and Molecular Biology. 2ª edición. John Wiley and Sons Ltd..
Raven, P.H., R.F. Evert y S.E. Eichhorn (1986). Biology of Plants 4th edition. Worth Publishers, Inc.
Ridge I (2002). Plants. The Open University. Oxford University Press
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Smith AM, Coupland G, Dolan L, Harberd N, Jones J, Martin C, Sablowski R y Amey A (2009) Plant biology. Garland Science, Nueva York.
Taiz L, Zeiger E (2006). Fisiología Vegetal. Publicaciones de la Universitat Jaume I, Castellón.
Taiz L, Zeiger E (2006). Plant Physiology. 4th. Cumming Publ. Company, Inc.
Westhoff, P. (1998). Molecular plant development from gene to plant. Oxford University Press.

Additional

- Se usarán revisiones de publicaciones periódicas como el Trends in Plant Science, Current Opinion in Plant Biology y similares, para aspectos concretos del temario.

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

English version is not available