UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2020/21
Subject (*)	Plant Physiology II		Code	610G02028
Study programme	Grao en Bioloxía			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Second	Obligatory	6
Language	SpanishGalicianEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Bioloxía			
Coordinador	Diaz Varela, Jose	E-mail	jose.diaz.varela@udc.es	
Lecturers	Bernal Pita da Veiga, María de los Ángeles	E-mail	angeles.bernal@udc.es	
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	Diaz Varela, Jose		jose.diaz.varela@udc.es	
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Web				
General description	The job of Biologist requires knowledge in several subjects. One of such topics is Plant Physiology, the science about how plants work. The present course is intended to provide theoretical and practical knowledge in Plant Physiology to the student, as well as a positive attitude to this science.			
Contingency plan	1. Changes in content The contents will not be modified, since they are basic for the formation of a Graduate in Biology 2. Methodologies Being a subject of the second semester, three situations may arise: A- Normal face-to-face teaching, if access to the Faculty was allowed at a time and capacity like those before the pandemic. In that case it would return to a fully face-to-face system. B- Hybrid teaching, if access to the Faculty is restricted during hours or capacity. In that case there would be a combination of face-to-face and online teaching. C- No face-to-face, if access to the Faculty was totally prohibited in that semester. In that case the teaching would be completelly online. * Teaching methodologies that are maintained In case A, all of them. * Teaching methodologies that are modified. In case B, the lectures would be taught on a rotating basis (the number of students would not exceed the allowed capacity of the classroom) and at the same time the class would be broadcasted online with Teams. In the case of the practicals, the capacity in the laboratory would be reduced and part of the practicals would be taught online with ad hoc materials generated by the lecturers. The small groups would be partly face-to-face and partly online. In case C, lectures, practicals and small groups would be carried out entirely online. 3. Mechanisms for personalized attention to students Email, tutoring by Teams and forums in Moodle, with daily attention in the case of email and forums, and upon request of the students in the case of tutoring by Teams. 4. Modifications in the assessment In case A, face-to-face. In cases B and C, online assessment (Moodle and other institutional tools). * Assessment observations: 5. Modifications of the bibliography or webgraphy In case A, none. In cases B and C: if possible, alternative and / or additional books in electronic format that were accessed from the beginning of that semester (provided that they are published as Open Access in the coming months or have an institutional subscription), and in any case additional ad hoc material generated by the lecturers.			

Study programme competences / results	
Code	Study programme competences / results
A8	Illar, analizar e identificar biomoléculas.
A18	Levar a cabo estudos de produción e mellora animal e vexetal.
A26	Deseñar experimentos, obter información e interpretar os resultados.
A29	Impartir coñecementos de Bioloxía.
A30	Manexar adecuadamente instrumentación científica.
A31	Desenvolverse con seguridade nun laboratorio.
B1	Aprender a aprender.
B2	Resolver problemas de forma efectiva.
B3	Aplicar un pensamento crítico, lóxico e creativo.
B5	Traballar en colaboración.
B7	Comunicarse de maneira efectiva nunha contorna de traballo.
B8	Sintetizar a información.
B13	Comportarse con ética e responsabilidade social como cidadán e como profesional.

Learning outcomes			
Learning outcomes	Study programme competences / results		
To be able to prepare and present a topic in the field of Plant Physiology	A8 A18 A29	B1 B8	
To have an updated knowledge about the mechanisms regarding how plants work and about their regulation.	A8 A18 A29		
To be able to carry out basic experments in the field of Plant Physiology.	A8 A26 A30 A31	B2	
To have a critical and constructive attitude about Plant Physiology.		B3 B13	
To be able to work in group to solve questions about Plant Physiology topics.		B1 B2 B5 B7	

Contents	
Topic	Sub-topic

PLANT DEVELOPMENT	Topic 1.- THE PLANT CELL WALL. Topic 2.- INTRODUCTION TO PLANT DEVELOPMENT. Topic 3.- AUXINS. Topic 4.- GIBBERELLINS. Topic 5.- CYTOKININS. Topic 6.- ETHYLENE. Topic 7.- ABSCISIC ACID. Topic 8.- OTHER PLANT HORMONES. Topic 9.- PHYTOCHROMES AND OTHER PHOTORECEPTORS. Topic 10.- PLANT LIFE CYCLE AND VEGETATIVE DEVELOPMENT. Topic 11.- PLANT MOVEMENTS. Topic 12.- FLOWERING. Topic 13.- PHYSIOLOGY OF PLANT REPRODUCTION. Topic 14.- FRUIT SET AND RIPENING. Topic 15.- PHYSIOLOGY OF DORMANCY AND GERMINATION. Topic 16.- AGING, SENESCENCE, ABSCISSION AND DEATH OF PLANTS.
Practicals	Practical 1 Leaf development and senescence Practical 2 Peroxidase activity and lignification in the stem Practical 3 Respiration during germination Practical 4 Effect of an auxin on the growth of oat coleoptyle Practical 5 Induction of alpha-amylase activity by gibberellins in barley seeds Practical 6 Induction of stomatal closure by abscisic acid Practical 7 Regulation of photomorphogenesis by red light and blue light.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A8 A18 A29 B1 B8 B13	28	70	98
Laboratory practice	A8 A26 A30 A31 B2 B3 B5 B7 B13	15	15	30
Seminar	A18 A29 B1 B2 B3 B5 B7 B8 B13	4	10	14
Mixed objective/subjective test	A8 A18 A26 A29 A30 A31	4	0	4
Personalized attention		4	0	4
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	Lectures. Oral presentation of topics including Power Point presentations, videos and/or blackboard explanations. During the lecture some questions about the topic can be asked to the student to favour learning.
Laboratory practice	Practicals. Practical activities as lab experiments and exercises.
Seminar	Seminars. Interactive study of one or several topics in a small group (ca. 10 students) tutorial session.
Mixed objective/subjective test	Final written exam with two parts: one about theory, another about practicals.

Personalized attention	
Methodologies	Description

Seminar	Seminars. Interactive study of one or several topics in a small group (ca. 10 students) tutorial session. Moreover, the students can ask any question about the topics of the course. For those students with official part-time dedication, the tutorial sessions might be replaced by a written work, if the student requires it.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Seminar	A18 A29 B1 B2 B3 B5 B7 B8 B13	The activities carried out by the students during the seminar sessions will be assessed continuously by the professor.	20
Mixed objective/subjective test	A8 A18 A26 A29 A30 A31	Exam about theoretical knowledge (60%) and the practicals (20%).	80
Others			

Assessment comments

The qualification assessment will have two parts:
1) Theoretical part of the course, including two methodologies:
"Seminario" ("seminar") and the theoretical part of
"proba mixta" (final exam).
2) Practical part of "proba mixta" (final exam).
To get a pass a student has to get a minimum of 4 points out of 10 in the Theoretical part of the course and a minimum of 4 points out of 10 in the Practical part. Moreover, a minimum of 4 points out of 10 has to be got in in the theoretical part of the "proba mixta" and also in the practical part of the "proba mixta". Moreover, in order to get the pass, the average/mean of the different parts and methodologies has to be at least 5 points out of 10. If the student got a mean equal or higher than 5 points but he/she got less than 4 points in any of the parts of the assessment and/or "proba mixta" indicated above, the final score will be 4.9 (fail).
In the second opportunity of assessment (July) it is only possible to repeat the "proba mixta", because the score of "Seminario" ("seminar") will be the same as obtained in the first opportunity. If the student has got a fail in the first opportunity, and the score of one of the parts (theoretical or practical) of the ?proba mixta? is 5 or higher, such score will be kept in the second opportunity, repeating only the other part of ?proba mixta?. However, the student can instead repeat the whole ?proba mixta?, providing he/she tells the professor in advance.
Attendance to practicals is compulsory. If a student does not attend to one or two sessions of the practicals, he/she will have a penalty of one and two points, respectively, to be substracted from the score of the ?proba mixta?.
If the student does not attend to three or more sessions of the practicals, he/she will get a fail as the final score in the course.
The students that do not carry out the "proba mixta" will be qualified as "NO PRESENTADO".
For those students with official academic exemption, the seminar sessions might be replaced by a written work, if the student requires it.

Sources of information

Basic	- AZCÓN-BIETO J, TALÓN M. (2008). Fundamentos de Fisiología Vegetal. McGraw Hill/ Interamericana, España. - BARCELÓ J, NICOLÁS G, SABATER B, SÁNCHEZ R (2001). Fisiología Vegetal. Ed. Pirámide, España - BUCHANAN et al. (2015). Biochemistry and molecular biology of plants, 2nd edition. Wiley-Blackwell ? ASPB - JONES, R. et al. (2013). The molecular life of plants. Wiley-Blackwell ? ASPB - SMITH, A.M. et al. (2010). Plant Biology. Garland Science, EE. UU. - TAIZ, L. & ZEIGER, E. (2010). Plant Physiology. Sinauer Associates, Massachusets - TAIZ, L. & ZEIGER, E. (2007). Fisiología Vegetal. (Traducción de la 3ª edición). Universitat Jaume I, España - TAIZ, L., ZEIGER, E., MOLLER, I.M. & MURPHY, A. (2015). Plant Physiology and Development 6th edition. Sinauer associates, Massachusets - TAIZ, L., ZEIGER, E., MOLLER, I.M. & MURPHY, A. (2018). Fundamentals of Plant Physiology. Sinauer associates, Oxford University Press - BHATLA, S.C. & LAL, M.A. (2018). Plant physiology, development and metabolism. Springer
Complementary	- SCOTT, P. (2008). Physiology and Behaviour of Plants.. John Wiley & Sons Ltd England - SALISBURY FB, ROSS CW. (2000). Fisiología delas plantas. Paraninfo, Madrid - HOPKINS W.G., HÜNER, N.P.A (2009). Introduction to Plant Physiology.. John Wiley & Sons, INC, New York. - AZCÓN-BIETO J, TALÓN M. (1993). Fisiología y Bioquímica Vegetal. . Interamericana. McGraw Hill. España - ALBERSHEIM et al. (2010). Plant Cell Walls from Chemistry to Biology. Garland Science, EE.UU. - CASAL J. (2006). Las plantas entre el suelo y el cielo. Editorial Eudeba

Recommendations
Subjects that it is recommended to have taken before
Chemistry/610G02001 Physics/610G02002 Biology: Basic Levels of Organisation of Life I (Cells)/610G02007 Biology: Basic Levels of Organisation of Life II (Tissues)/610G02008 Biochemistry I/610G02011 Biochemistry II/610G02012 Introduction to Botany: General Botany/610G02023 Plant Physiology I/610G02027
Subjects that are recommended to be taken simultaneously
Microscopic Organography/610G02009 Genetics/610G02019
Subjects that continue the syllabus
Applied Plant Physiology /610G02029 Plant Response to Adverse Conditions/610G02030
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.