UNIVERSIDADE DA CORUÑA

| Teaching Guide | | | |
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| Identifying Data | | | 2016/17 |
| Subject (*) | Mecanismos Moleculares da Interacción Planta-patóxeno | Code | 610441018 |
| Study programme | Mestrado Universitario en Bioloxía Molecular , Celular e Xenética | | |

| Descriptors | | | | |
|---|---|---|---|---|
| Cycle | Period | Year | Type | Credits |
| Official Master's Degree | 2nd four-month period | First | Optativa | 3 |

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|---|---|---|---|
| Language | SpanishGalicianEnglish | | |
| Teaching method | Face-to-face | | |
| Prerequisites | | | |
| Department | Bioloxía Animal, Bioloxía Vexetal e Ecoloxía | | |
| Coordinador | Diaz Varela, Jose | E-mail | jose.diaz.varela@udc.es |
| Lecturers | Bernal Pita da Veiga, angeles<br>Diaz Varela, Jose<br>Silvar Pereiro, Cristina | E-mail | angeles.bernal@udc.es<br>jose.diaz.varela@udc.es<br>c.silvar@udc.es |
| Web | | | |
| General description | This subject is focused on the molecular aspects of plant-pathogen interaction and, in a short view, of interactions related to other organisms (herbivores, rhizobioa and mycorrhyzae) | | |

| Study programme competences / results | |
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| Code | Study programme competences / results |
| A4 | Skills to apply molecular techniques to the study of the plant cell physiology, its response to external triggers and their biotechnological applications. |
| A5 | Skills of understanding the microorganisms' role as pathogenic agents and as biotechnological tools. |
| A6 | Skills of understanding the functioning of cells through the structural organization, biochemistry, gene expression and genetic variability. |
| A8 | Skills of having an integrated view of the previously acquired knowledge about Molecular and Cellular Biology and Genetics, with an interdisciplinary approach and experimental work. |
| B3 | Skills of management of the information: that are able to gather and to understand relevant information and results, obtaining conclusions and to prepare reasoned reports on scientific and biotechnological questions |
| B5 | Correct oral and written communication on scientific topics in the native language and at least in another International diffusion language. |
| B9 | Skills of preparation, show and defense of a work. |

| Learning outcomes | | | |
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| Learning outcomes | Study programme competences / results | | |
| - To understand the molecular mechanisms of plant-pathogen interaction | AR4<br>AR5 | | |
| - To know the different mechanisms of the plant response to pathogens. | AR4<br>AR5<br>AR6<br>AR8 | | |
| To understand and be able to use the experimental approaches to research in this field. | AR4<br>AR5 | BR3<br>BR5 | |
| - Ability for critically reviewing scientific papers related to this subject. | AR5<br>AR6 | BR3<br>BR5<br>BR9 | |

| Contents | |
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| Topic | Sub-topic |

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| Molecular mechanisms in plant-pathogen interaction. | Recognition of the plant by the pathogen and mechanism to attack the plant. Recognition of the pathogen by the plant amnd mechanisms of defense. Pathogen Associated Molecular Patterns (PAMPs). Oxidative burst. Salicylates, jasmonates and ethylene. Hypersensitive response. Gene-for-gene resistance. Nonhost resistance. Induced resistance to pathogens: SAR and ISR. Npr1. Priming. Transcription factors involved in resistance. |
| Other interactions related to plant-pathogen interaction. | Recognition of herbivores, signalling and defense mechanisms. Rhizobium-plant interaction. Mycorrhizae. |

| Planning | | | | |
|---|---|---|---|---|
| Methodologies / tests | Competencies / Results | Teaching hours (in-person & virtual) | Student?s personal work hours | Total hours |
| Guest lecture / keynote speech | A4 A5 A6 A8 | 12 | 30 | 42 |
| Document analysis | A6 A5 B3 B5 B9 | 2 | 10 | 12 |
| Laboratory practice | A4 A5 B3 B5 | 7 | 10.5 | 17.5 |
| Objective test | A4 A5 A6 A8 | 2.5 | 0 | 2.5 |
| Personalized attention | | 1 | 0 | 1 |
| (*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students. | | | | |

| Methodologies | |
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| Methodologies | Description |
| Guest lecture / keynote speech | Lectures about main contents of the subject, supported by presentations and videos. Presentation is combined with critical dialogue with the students about the topics. |
| Document analysis | Reading and analysis of a primary research paper related to the subject, accompanied by its presentation in the classroom by the student and further discussion with the lecturer and the other students. |
| Laboratory practice | Practicals related to the subject, consisting in experiments, followed by data analysis, discussion and writing of a report. |
| Objective test | Exam about the topics of the lectures. |

| Personalized attention | |
|---|---|
| Methodologies | Description |
| Document analysis | The students can attend, in the corresponding hours, to the lecturer´s office to ask any question about the subject, and particularly about the work to do.<br>For those students with official part-time dedication, the attendance to the lectures might be replaced by a written work, if the student requires it. |

| Assessment | | | |
|---|---|---|---|
| Methodologies | Competencies / Results | Description | **Qualification** |
| Guest lecture / keynote speech | A4 A5 A6 A8 | Attendance and participation in the lectures. | 10 |
| Document analysis | A6 A5 B3 B5 B9 | Aspects to be assessed: Proper understanding of the paper by the student, the presentation in the classroom and the participation in the discussion in the classroom (including the critical review of the paper). | 40 |
| Laboratory practice | A4 A5 B3 B5 | Attendance and participation in the laboratory, as well as a written report. | 20 |
| Objective test | A4 A5 A6 A8 | Exam about the topics in the lectures. | 30 |

| Assessment comments |
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The students who pass the subject in the first opportunity, will be prefentially considered to get the highest qualification (with honors).
For those students with official part-time dedication, the attendance to the lectures might be replaced by a written work, if the student requires it.

| Sources of information | |
|---|---|
| Basic | Dickinson, M. 2003. Molecular Plant Pathology. Bios Scientific Publishers.Hammond-Kosack, K.E. & Jones, J.D.G. 2015. Responses to plant pathogens. En: Buchanan, B.B., Gruissem, W. & Jones, R.L (eds.) "Biochemistry and molecular biology of plants" Capítulo 22, pp. 984-1050. Wiley-Blackwell-ASPB. Smith, A.M., Cupland, G., Dolan, L., Harberd, N., Jones, J., Marin, C., Sablowski, R. & Amey, A.. 2009. Plant Biology. Garland Science. Capítulo 8.Taiz, L., Zeiger, E., Moller, I.M. & Murphy, A. 2014. plant Physiology and development, Sixth Edition. Sinauer Associates, Inc. Capítulo 23.Walters, D. R. 2011. Plant defense. Wiley-Blackwell. |
| Complementary | - Agrios, G. N. 2005. Plant pathology, 5ª Ed. Academic Press.- Albersheim, P. Darvill, A., Roberts, K., Sederoff, R. & Staehelin, A.. 2010. Plant Cell Walls: from Chemistry to Biology. Garland Science. Capítulo 8.- Dyakov, Y., Dzhavakhiya, V. & Korpela, T. 2007. Comprehensive and molecular phytopathology. Elsevier.- Huang, J.-S. 2001. Plant pathogenesis and resistance: biochemistry and physiology of plant-microbe interactions. Kuwer Academic Publishers.- Nuez, F., Pérez de la Vega, M. & Carrillo, J.M. 2004. Resistencia genética a patógenos vegetales. Univ. Politécnica de Valencia ? Univ. de León.- Pallás, V., Escobar, C., Rodríguez Palenzuela, P. & Marcos, J.F. 2008. Herramientas biotecnológicas en fitopatologia. Ed. Mundi-Prensa.- Parker, J. 2009. Molecular aspects of plant disease resistance. Blackwell Publishing Ltd.- Slusarenko, A. J., Fraser, R. S. S. & van Loon, L. C. 2000. Mechanisms of resistance to plant diseases. Kluwer Academic Publishers.- Walters, D., Newton, A. & Lyon, G. 2007. Induced resistance for plant defence. A sustainable approach to crop protection. Blackwell Publishing. |

| Recommendations |
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| Subjects that it is recommended to have taken before |
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| Subjects that are recommended to be taken simultaneously |
| Biotecnoloxía en plantas/610441019 |
| Subjects that continue the syllabus |
| Técnicas Celulares/610441001<br>Técnicas Moleculares/610441002<br>Señalización Celular/610441004 |
| Other comments |
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**(*)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.**