



Teaching Guide

Teaching Guide				
Identifying Data				2022/23
Subject (*)	Complements of Formation for the education of the Sciences 2		Code	652601112
Study programme	1 Mestrado Universitario de Profesorado de Educación Secundaria: Ciencias Experimentais			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	Yearly	First	Obligatory	5
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Física e Ciencias da Terra			
Coordinador	Grandal D`Anglade, Aurora		E-mail	aurora.grandal@udc.es
Lecturers	Grandal D`Anglade, Aurora Nogueira Lopez, Pedro Fernando		E-mail	aurora.grandal@udc.es pedro.nogueira@udc.es
Web				
General description	Subject based on the review or acquisition of fundamental concepts in the natural sciences, their recent developments and their application to current problems, as an educational resource in Secondary Education and Bachillerato.			

Study programme competences

Code	Study programme competences
A16	(CE-E2)Coñecer os contidos que se cursan nos respectivos ensinos.
A18	(CE-E4)Coñecer contextos e situacións en que se usan ou aplican os diversos contidos curriculares
C1	Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma.
C4	Desenvolverse para o exercicio dunha cidadanía aberta, culta, crítica, comprometida, democrática e solidaria, capaz de analizar a realidade, diagnosticar problemas, formular e implantar solucións baseadas no coñecemento e orientadas ao ben común.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C7	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.
C8	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

Learning outcomes

Learning outcomes	Study programme competences		
To know the educational and cultural value of the subjects corresponding to the specialisation.	AJ16		
To be familiar with the contents of the respective courses.	AJ16		
To Know the contexts and situations in which the different curricular contents are used or applied.	AJ18		
To Express themselves correctly, both orally and in writing, in the official languages of the Autonomous Community.			CC1
Develop for the exercise of an open, educated, critical, committed, democratic and supportive citizenship, capable of analysing reality, diagnosing problems, formulating and implementing solutions based on knowledge and oriented towards the common good.			CC4
Critically assess the knowledge, technology and information available to solve the problems they have to face.			CC6
Assume as a professional and citizen the importance of lifelong learning.			CC7
Value the importance of research, innovation and technological development in the socio-economic and cultural progress of society.			CC8

Contents

Topic	Sub-topic
Analysis of the thematic blocks of the natural sciences curriculum	Interrelationships



The contents of experimental sciences in secondary education and bachillerato	The BOE: the different levels of education
Acquisition and/or revision of fundamental and experimental concepts in the area of natural sciences.	Biology: Biomolecules and metabolism. The cell. Levels of organisation. Evolution Physics: mechanics, thermodynamics, electricity and magnetism. Geology: plate tectonics, internal processes, external processes and geological hazards. Geological maps. Chemistry: matter, chemical bonding and intermolecular forces, acid-base and redox reactions.
Context and current scientific situations as an educational resource	Clean and renewable energies. Climate change. Viruses and vaccines, health and pseudosciences

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student's personal work hours	Total hours
Guest lecture / keynote speech	A16 A18 C1 C4 C6 C7 C8	18	45	63
Document analysis	A16 A18 C1 C6 C7 C8	5	20	25
Objective test	A16 A18 C1 C4 C6 C7 C8	2	2	4
Collaborative learning	A16 A18 C1 C4 C6	10	22	32
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	
Methodologies	Description
Guest lecture / keynote speech	Exposición oral complementada co uso de medios audiovisuais e a introducción de algunhas preguntas dirixidas aos estudantes coa finalidade de transmitir coñecementos e facilitar a súa aprendizaxe
Document analysis	Técnica metodolóxica que supón a utilización de documentos audiovisuais e/ou bibliográficos (fragmentos de reportaxes documentais ou películas, noticias de actualidade, paneis gráficos, fotografías, biografías, artigos, textos lexislativos, etc.) relevantes para a temática da materia con actividades especificamente deseñadas para a análise dos mesmos. Pódese empregar como introdución xeral a un tema, como instrumento de aplicación do estudo de casos, para a explicación de procesos que non se poden observar directamente, para a presentación de situacións complexas ou como síntese de contidos de carácter teórico ou práctico.
Objective test	Proba escrita utilizada para a avaliación da aprendizaxe, cuxo trazo distintivo é a posibilidade de determinar se as respostas dadas son ou non correctas. Constitúe un instrumento de medida, elaborado rigorosamente, que permite avaliar coñecementos, capacidades, destrezas, rendemento, aptitudes, actitudes, intelixencia, etc. É de aplicación tanto para a avaliación diagnóstica, formativa como sumativa.
Collaborative learning	Conxunto de procedementos de ensino-aprendizaxe guiados de forma presencial e/ou apoiados con tecnoloxías da información e as comunicacións, que se basean na organización da clase en pequenos grupos nos que o alumnado traballa conxuntamente na resolución de tarefas asignadas polo profesorado para optimizar a súa propia aprendizaxe e a dos outros membros do grupo.

Personalized attention	
Methodologies	Description
Collaborative learning Document analysis	The student's work in each of the proposed methodologies will be attended by the teacher on an individual and personalised basis. Tutorials (personal, via Teams or e-mail) are conceived as an activity of the utmost importance in this subject.



Assessment			
Methodologies	Competencies	Description	Qualification
Objective test	A16 A18 C1 C4 C6 C7 C8	Examen final sobre os contidos da materia Valorarase : Coñecer o valor formativo e cultural das materias correspondentes á especialización. Coñecer a historia e os desenvolvementos recentes das materias e as súas perspectivas para poder transmitir unha visión dinámica das mesmas. Coñecer contextos e situacións en que se usan ou aplican os diversos contidos curriculares. Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma. Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse. Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida	40



Document analysis	A16 A18 C1 C6 C7 C8	Elaboración de traballos sobre contidos e metodoloxías aplicadas o ámbito científico Valorarase : Coñecer o valor formativo e cultural das materias correspondentes á especialización. Coñecer a historia e os desenvolvementos recentes das materias e as súas perspectivas para poder transmitir unha visión dinámica das mesmas. Coñecer contextos e situacións en que se usan ou aplican os diversos contidos curriculares. Integrar a formación en comunicación audiovisual e multimedia no proceso de ensino-aprendizaxe. Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida. Integrar a formación en comunicación audiovisual e multimedia no proceso de ensino-aprendizaxe. Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma. Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse. Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida	60
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Assessment comments

Attendance at the face-to-face sessions is compulsory, even in the event that these sessions have to be carried out telematically (Teams).

At the first opportunity

- The activities and work carried out during the course and a written test will be assessed. The grade will be the weighted average of the marks obtained in each part, and a pass mark (5 out of 10) must be obtained in each part.
- A minimum attendance of 80% of the face-to-face sessions is an essential requirement. If this percentage is not reached, the activities/assignments will not be evaluated and the grade will be a failing grade.

In the second opportunity

- Students who attended at least 80% of the sessions will have to repeat the parts not passed (activities/works and/or written test).
- Students who had not reached the required percentage of attendance to the face-to-face sessions will have to present, individually, all the activities/assignments proposed throughout the course.
- In any case, the grade will be the weighted average of the marks obtained in each part, and a pass mark (5 out of 10) must be obtained in each of them.

Students with recognition of part-time dedication and academic dispensation of exemption from attendance:

- They must inform the teacher (aurora.grandal@udc.es) during the first week of class.
- At the first opportunity, in addition to the written test, they will have to carry out, individually, all the activities/assignments proposed throughout the course and hand them in on the dates established by the teaching staff.

The final mark will be the weighted average of the marks for the activities and work carried out during the course and the mark for the written test, each part of which must be passed (5 out of 10).

- At the second opportunity, they must repeat the parts not passed (activities/works and/or written test).



Sources of information

Basic	DOGA Nº 136 de viernes 13 de xullo de 2007 y 23 de xuño de 2008:http://www.xunta.es/Dog/Dog2007.nsf/FichaSeccion/25E8E?OpenDocument http://www.xunta.es/Dog/Dog2008.nsf/FichaContenido/29EFE?OpenDocumenthttp://www.xunta.es/Dog/Dog2008.nsf/FichaContenido/29EFE?OpenDocumenthttp://docentes.leer.es/2010/10/04/leer-para-aprender-ciencias/Libros de distintas editoriales correspondientes a ESO y BachilleratoObras de interés para Geología:Gutiérrez Elorza, M. (2008). Geomorfología. Ed. Pearson-Prentice Hall. Madrid, 898 pp. Anguita-Virella, F. & Moreno-Serrano, F. (1991) Procesos Geológicos Internos. Editorial Rueda, Madrid, 232 pp. Anguita-Virella, F. (2002) Biografía de la Tierra. Editorial Aguilar, Madrid, 350 pp. Enlaces de interés para Geología: http://www.ucm.es/info/diciex/programas/las-rocas/ciclorocas/CiclorocasCUARTO.swf http://www.windows.ucar.edu/tour/link=/earth/geology/rocks_intro.sp.html&br=gra&edu=elem http://www.isftic.mepsyd.es/w3/eos/MaterialesEducativos/mem2000/tectonica/index_1.htm http://www.palaeos.com/ http://tolweb.org/tree/ http://alerce.pntic.mec.es/~mnavar6/index.htm http://www.isftic.mepsyd.es/w3/eos/MaterialesEducativos/mem/claves_evolucion/claves.htm http://www.uned.es/cristamine/inicio.htm http://www.isftic.mepsyd.es/jovenes/biologia_y_geologia/ http://www.isftic.mepsyd.es/jovenes/ciencias_naturales/ http://recursos.cnice.mec.es/biosfera/profesor/index.htm http://www.juntadeandalucia.es/averroes/~41009858/departamentos/ciencias.htm Obras de interés para Biología:Curtis, H.; Barnes, S.; Schnek, A. y Flores, G. (2006). Invitación a la Biología. Editorial Médica Panamericana. Audesirk, T.; Audesirk, G. y Byers, B. E. (2008). Biología. La vida en la Tierra. Ed. Prentice-Hall . 8.a ed., Anguita-Virella, F. (2002) Biografía de la Tierra. Editorial Aguilar, Madrid, 350 pp. Enlaces de interés en Biología: http://www.biologia.arizona.edu/DEFAULT.HTML http://www.maph49.galeon.com/entrada.html http://www.encuentros.uma.es/ http://www.faunaiberica.org/ http://www.areaciencias.com/ http://alerce.pntic.mec.es/~mnavar6/index.htm http://www.isftic.mepsyd.es/jovenes/ciencias_naturales/ http://www.isftic.mepsyd.es/jovenes/biologia_y_geologia/ http://www.isftic.mepsyd.es/w3/eos/MaterialesEducativos/mem2001/biologia/index.html http://web.educastur.princast.es/proyectos/biogenio_ov/index.htm
Complementary	http://teachers.web.cern.ch www.igp.gob.pe/mag.htm www.contenidos.com/fisica/ www.cec.uchile.cl/cutrerapunt/nuevo.html WWW.CTV.ES www.sc.ehu.es www.educared.net www.cofis.es www.rsef.es www.omega.ilce.edu www.geocities.com www.educar.sc.usp.br/ciencias/fisica/fisicaespanhol http://www.sc.ehu.es/sbweb/fisica/ http://home.cvc.org/science/kepler.htm http://sasx01.sc.ehu.es/sbweb/fisica/electromagnet/induccin/variable/variable.htm#actividades www.educared.net/aprende/sofwareeducativo/index.htm http://microcosm.web.cern.ch/microcosm/engl/prevesp.html http://webcast.cern.ch/projects/weblecturearchive/index.html www.idae.es http://www.sc.ehu.es/sbweb/fisica/default.htm http://www.sc.ehu.es/sbweb/fisica/estadistica/gasIdeal/gasIdeal.html http://lectura.ilce.edu.mx:3000/sites/ciencia/volumen1/ciencia2/36/html/ysin.htmlhttp://teachers.web.cern.ch www.igp.gob.pe/mag.htm www.contenidos.com/fisica/ www.cec.uchile.cl/cutrerapunt/nuevo.html WWW.CTV.ES www.sc.ehu.es www.educared.net www.cofis.es www.rsef.es www.omega.ilce.edu www.geocities.com www.educar.sc.usp.br/ciencias/fisica/fisicaespanhol http://www.sc.ehu.es/sbweb/fisica http://home.cvc.org/science/kepler.htm http://sasx01.sc.ehu.es/sbweb/fisica/electromagnet/induccin/variable/variable.htm#actividades www.educared.net/aprende/sofwareeducativo/index.htm http://microcosm.web.cern.ch/microcosm/engl/prevesp.html http://webcast.cern.ch/projects/weblecturearchive/index.html www.idae.es http://www.sc.ehu.es/sbweb/fisica/default.htmhttp://www.sc.ehu.es/sbweb/fisica/estadistica/gasIdeal/gasIdeal.htmlhttp://lectura.ilce.edu.mx:3000/sites/ciencia/volumen1/ciencia2/36/html/ysin.html

Recommendations

Subjects that it is recommended to have taken before



Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments



It is recommended that assignments in this subject be sent electronically, and if this is not possible, not to use plastic, to choose double-sided printing, to use recycled paper and to avoid printing drafts. The sustainable use of resources and the prevention of negative impacts on the natural environment should be taken into account. The importance of ethical principles related to sustainability values should be taken into account in personal and professional behaviour. The gender perspective will be taken into account in this subject (non-sexist language will be used, bibliography of authors of both sexes will be used, the intervention of male and female students in class will be encouraged...). Work will be done to identify and modify sexist prejudices and attitudes, and the environment will be influenced in order to modify them and promote values of respect and equality. The full integration of students who, for physical, sensory, mental or socio-cultural reasons, experience difficulties in gaining suitable, equal and beneficial access to university life will be facilitated.

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