



IDENTIFYING DATA

Environmental impact evaluation

Subject	Environmental impact evaluation			
Code	V02G030V01904			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	#EnglishFriendly Spanish Galician			
Department				
Coordinator	Olabarria Uzquiano, Celia			
Lecturers	Fernández Covelo, Emma Muñoz Sobrino, Castor Olabarria Uzquiano, Celia Velandó Rodríguez, Alberto Luís			
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Web				
General description	<p>The objective of this subject is developed each of the steps that compose the process of evaluation of environmental impact from different points of view: existing legislation, administrative procedure, and the different types of methodologies employed in the studies of environmental impact. Likewise, the student will learn the basic bases stop the realization of studies of environmental impact, #analyze critically diverse examples of studies and realizing a study of concrete environmental impact.</p> <p>English Friendly subject: International students may request from the teachers: a) resources and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.</p> <p>School calendar #http://bioloxia.uvigo.es/*gl/*docencia/schedules</p>			

Training and Learning Results

Code	
A1	Students should prove understanding and knowledge in this study field that starts in the Secondary Education and with a level that, even though it is supported in advanced books, also includes some aspects that involve knowledge from the vanguard of the study field.
A2	Students should know how to apply their knowledge to their work or vocation in a professional way. They also should have the competences that are usually proved through the elaboration and defence of arguments and the resolution of problems within their study field.
A3	Students should prove ability for information-gathering and interpret important data (usually within their study field) to judge relevant social, scientific or ethical topics.
A4	Students should able to communicate information, ideas, issues and solutions to all audiences (specialist and unskilled audience).
A5	Students should develop the necessary learning skills to undertake further studies with a high degree of autonomy
B2	Ability of reading and analyzing scientific papers and having critical assessment skills to understand data collection, deducing the main idea from the least relevant ones and basing on the corresponding conclusions.
B3	Acquisition of general knowledge about the basic subjects of biology, both at theory and experimental level, without dismissing a higher specialization in subjects that are oriented to a concrete professional area.
B4	Ability in handling experimental tools, both scientific and computer technology equipment that support the search for solutions to problems related to the basic knowledge of biology and with those of a concrete labour context.
B5	Understanding of the levels of organization of living beings from a structural (molecular, cellular and organic) and functional point of view by observing their relations with the environment and other organisms, as well as their appearances in situations of environmental alteration.

B7	Collection of information about issues of biologic interest, analysis and emission of critical opinions and reason them including the reflection about social and/or ethical aspects related to the issue.
B10	Development of analytic and abstraction skills, the intuition and the logical and rigorous thought through the study of biology and its uses.
B11	Ability to communicate in detail and clearly: knowledge, methodology, ideas, issues and solutions to all audiences (not only qualified but unskilled in Biology).
B12	Ability to identify their own educational necessities in the biology field and in concrete labour areas and to organize their learning with a high grade of autonomy in any context.
C1	Obtaining, managing, preserving, describing and identifying current biological organisms and fossils.
C11	Sampling, characterizing, managing, preserving and restoring Populations, Communities and Ecosystems.
C12	Cataloguing, mapping, assessing, preserving, restoring and managing natural and biological resources.
C13	Assessing environmental impact. Diagnosing and solving environmental issues
C14	Realising the analysis, control and purifying of waters.
C15	Describing, analysing, evaluating and planning of the physical environmental. Intepreting the scenery.
C19	Identifying, addressing and communicating Agro-Food and environmental risks.
C22	Identifying, describing and using bioindicators.
C25	Gathering background information, develop experimental work and analysing data results
C27	Developing and monitoring management systems and quality control on Biology
C29	Helping and evaluating scientific, technical, ethical, legal and socioeconomically aspects related to Biology.
C31	Knowing and handling technical and scientific apparatus.
C32	Knowing and handling basic or specific key concepts and terminology
C33	Understanding the social projection of Biology.
D1	Development of capacity of analysis and synthesis
D2	Acquisition of the organization and planning capacity for tasks and time
D3	Development of oral and writting communication abilities
D4	Acquisition of foreign language knowledge related to the study field
D5	Use of computer resources related to the study field
D6	Research and interpreting of information from different sources
D7	Resolution of issues and decision making in an effective way
D8	Development of the ability of independent learning
D9	Ability to work in collaboration or creating groups with an interdisciplinary character
D10	Development of the critical thinking
D11	Adquisition of an ethical agreement with the society and the profession
D12	Respectful behaviour to diversity and multiculturalism
D13	Sensitivity for environmental issues
D14	Adquisition of abilities in the interpersonal relationships
D16	Acceptance of a quaility commitment
D17	Development of the self-criticism ability
D18	Development of negotiating power

Expected results from this subject

Expected results from this subject	Training and Learning Results	
Know the administrative procedure of Evaluation of Environmental Impact how technical instrument of management of the environment	C13 C32	D1 D6 D8 D11 D13 D16
Identify, foretell and evaluate of form integrated the impacts envelope the ecosystems, his components, the natural resources and the quality of human life in the execution of projects, works and installations and his alternative	C1 C11 C12 C14 C15 C19 C31 C32	D1 D2 D3 D5 D6 D7 D8 D10 D13 D16

Differentiate the types of measures stop the prevention, protection, correction and compensation of the negative effects envelope the environment of the execution of projects, works and installations			C11	D1
			C12	D2
			C13	D3
			C15	D4
			C29	D5
			C31	D6
			C32	D7
				D9
				D10
				D12
Know the methods of surveillance of environmental impacts and power evaluate the #efficacy of measures *correctoras of environmental impacts of projects, works and installations			C11	D4
			C12	D5
			C13	D6
			C15	D7
			C31	D13
			C32	D16
Apply knowledges of evaluation of environmental impact to identify, handle and #analyze **especímenes and samples of biological origin				D17
	A1	B2	C1	D1
	A2	B3	C11	D2
	A3	B4	C12	D4
	A5	B5	C13	D5
		B7	C15	D6
		B10	C22	D7
			C25	D8
			C31	D9
			C32	D10
			C33	D11
				D12
				D13
				D14
				D16
				D17
				D18
Apply knowledges and technical own of the evaluation of environmental impact in different processes related with the management of the environment	A1	B2	C11	D1
	A2	B3	C12	D2
	A3	B4	C13	D3
	A4	B7	C14	D4
	A5	B10	C15	D5
		B11	C19	D6
		B12	C22	D7
			C25	D8
			C29	D9
			C32	D10
			C33	D11
				D12
				D13
				D14
				D16
Apply knowledges and relative technology to the evaluation of environmental impact in aspects related with the control of quality of studies of environmental impact, projects of measures *correctoras and reports of tracking				D17
				D18
	A2	B4	C11	D1
	A4	B5	C12	D2
	A5	B12	C13	D3
			C14	D4
			C15	D5
			C19	D6
			C22	D7
			C27	D9
			C29	D10
			C32	D11
			C33	D12
				D13
				D14
				D16
				D17
				D18

Obtain information, develop experiments and interpret results	A2	B2	C1	D1
	A4	B3	C11	D2
	A5	B4	C12	D3
		B7	C14	D4
		B10	C15	D5
		B12	C19	D6
			C22	D7
			C25	D8
			C31	D9
			C33	D10
				D11
				D12
				D13
				D14
				D16
				D17
				D18
Comprise the social projection of the evaluation of environmental impact and his repercussion in the professional exercise	A2	B7	C13	D2
	A3	B11	C27	D7
	A4	B12	C29	D9
			C32	D10
			C33	D11
				D12
				D13
				D14
				D16
				D17
				D18
Know and handle the concepts, terminology and scientific instrumentation-technical relative to the evaluation of environmental impact	A1	B2	C1	D2
	A3	B3	C11	D3
	A4	B4	C12	D4
		B5	C14	D5
		B7	C15	D6
		B11	C19	D8
		B12	C22	D9
			C25	D10
			C27	D11
			C31	D16
			C32	

Contents

Topic	
Block A. Conceptual and practical bases professional of the Evaluation of environmental impact (EIA)	1. Conceptual and objective bases of the evaluation of environmental impact (EIA). The paper of the EIA in the management of the natural resources: environmental strategic evaluation (ESE), environmental auditing (EA). General concepts: environment, impact, evaluation. Typology of the impacts. Typology of the evaluations. (2 hours) 2. The study of environmental impact (EIS).- Objective and structure. Organisational aspects of the EIS: group interdisciplinary, group leader, management of the EIS. The challenge of the EIS stop the scientific disciplines: recommendations with information limited, multidisciplinary, subjective assessment. Phases of the EIS. (2 hours)
Block B. Legislation and normative of EIA	3. Legislation and administrative procedure of the EIA.- History of the EIA. Legislation of reference: European directives, national legislation and legislation of the Galician Community. Projects that owe to be object of EIA. Agents involved: promoter, environmental organ, substantive organ, public opinion. Administrative procedure. Information and public participation. (1 hour)

Block C. Manufacture of studies of environmental Impact. Methods of identification, prediction and evaluation of impacts.

4. Phase 1 and 2 of the EIS.- Description of the project: antecedents, location, actions. Examination of alternatives technically viable. (2 hours)
5. Phases 3 and 4 of the EIS: environmental Inventory; identification and prediction of impacts.- The environmental inventory only requires to apply the already gained knowledges; relevant subjects for EIS. Scoping as a tool in the environmental inventory: lists of review, surveys, queries to experts. Methods of identification of impacts: matrices of Leopold interaction , of secondary effects, crossed; lists of simple and descriptive control; systems of flow charts; Battelle system; maps overlay. (2 hours)
6. Abiotic factors (floor and underground waters, superficial waters, geological processes, climate, noise and light).- Election of the relevant factors , calculation of abiotic environmental indexes, methodology of measurement of abiotic factors. Identification and prediction of impacts. (2 hours)
7. Biotic factors (flora and vegetation, fauna, ecological processes).- Election of the relevant factors , calculation of biotic environmental indexes , methodology of measurement of biotic factors. Identification and prediction of impacts. (2 hours)
8. Landscape factors (agricultural uses).- Election of the relevant factors, calculation of landscape environmental indexes, methodology of measurement of landscape factors. Identification and prediction of impacts. (2 hours)
9. Socioeconomic factors (historical, archaeological, employment, economic cost of the degradation).- Election of the relevant factors , calculation of socioeconomic environmental indexes, methodology of measurement of socioeconomic factors. Identification and prediction of impacts. (2 hours)
10. Phase 4 of the EIS (continuation): assessment of impacts.- Quantitative assessment, qualitative assessment. Uncertainty of the assessment. Integration of impacts (functions of transformation). (4 hours)
11. Phase 5 of the EIS.- Establishment of protective and corrective measures of the EIS.- Program of environmental surveillance. (1 hour)
13. Phase 7 of the EIS.- Document of synthesis. (1 hour)

Planning			
	Class hours	Hours outside the classroom	Total hours
Mentored work	0	26	26
Studies excursion	2.5	1.5	4
Laboratory practical	7.5	7.5	15
Lecturing	25	75	100
Problem and/or exercise solving	2	0	2
Essay	1	0	1
Systematic observation	1	0	1
Presentation	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	
	Description
Mentored work	The work consists in that the students in groups of reduced size (3-4) will carry out an environmental impact assessment study based on a real case study. This work includes the presentation of a written report and a brief oral defence (10 minutes) in front of the rest of students and lecturers.
Studies excursion	The field course will be around the lake at Campus Lagoas-Marcosende and in the Budiño Gandaras. Students will do a matrix to evaluate impacts
Laboratory practical	In the laboratory practices or classroom the students will carry out diverse activities: 1- comparative analysis of diverse environmental impact studies (aeolian parks, road, mines, marine aquiculture, etc.). 2- Building of an impact matrix. 3- Analysis of alternatives in studies of environmental impact assessment.
Lecturing	In the lecture, lecturer will expose the basic concepts of the subject and valid legislation, employing diverse teaching resources such as the electronic blackboard, power point presentation and critical analysis of texts.

Personalized assistance

Methodologies	Description
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Lecturing	Lectures will be supported with teaching material presented in power point, scientific articles in Spanish and English that will be discussed in the classroom and legal texts.
Mentored work	An environmental impact assessment study based on a case study will be done. The case study will be chosen at the beginning of the course.
Studies excursion	An impact matrix based on a real practical case will be done.
Laboratory practical	A critical analysis of an environmental impact statement will be done. Moreover, qualitative and quantitative environmental impact matrices will be done using real practical cases. Students will use these data to choose between different alternatives and to calculate and assess the final impact.
Tests	Description
Presentation	

Assessment						
	Description	Qualification	Training and Learning Results			
Problem and/or exercise solving	The acquired knowledge in lectures will be evaluated using a short answer tests that include questions of critical reasoning and the resolution of problems and cases (3,5 points). Numerical final qualification of 0 to 10 according to valid legislation (RD 1125/2003 of 5 of September, BOE 18 of September).	35	A1 A2 B4 B5	B2 B3 C12 C13	C1 C11 C12 C13	D1 D3 D7 D10
Essay	The written report (4 points, 40% of the final note) will be evaluated in three phases: first draft (0,5 points, 5%), second draft (1 point, 10%) and final report (2,5 points, 25%). The oral defence of the written report will be done during 10 minutes in presence of the rest of the students and of the teaching staff of the subject. After the oral defence, there will be a turn of questions of 5 minutes.	40	A3 A4 A5 B12	B7 B10 B11 C13	C1 C11 C12 C13	D1 D2 D3 D4
Systematic observation	The attendance and active participation of students in theoretical classes, demonstrations and seminars will be taken into account. The exercises proposed by the teachers will also be taken into account. Attendance at demonstrations is compulsory and students must attend at least 90% of the demonstrations and seminars so that this methodology can be evaluated.	5		B2 B5	C19	D12 D14 D17
Presentation	The oral defence of the written report will be evaluated (2 points, 20%). The oral defence of the written report will be done during 10 minutes in presence of the rest of the students and of the teaching staff of the subject. After the oral defence, there will be a turn of questions of 5 minutes.	20	A1 A2 A3 A4	B2 B7 B10 B11	C25 C27 C32 C33	D1 D3 D6 D8
						D10 D14 D16

Other comments on the Evaluation

In order to pass the subject, the student must pass each of the parts independently, and for this they must obtain a score of at least half the value of each one of them. If the student fails any of the parts, the final grade is divided by 2. For the July call, the pass will be kept in each of the parts considered in the evaluation system (theory and essay). Once the course is finished, in the case of failing in the two available calls, enrolling in the new course requires repeating everything.

The qualification of **Not presented** is considered when the student body does not appear for the theory exam and/or does not participate in some of the phases of the essay (delivery of reports and/or oral presentation of the essay).

Assistance to laboratory demonstrations and field trip:

In the case of unjustified absences to these sessions, there will be no right to recover these methodologies in the second opportunity (July call).

Exam dates:

The official dates of the exams, updated and approved by the Xunta de Facultade, can be consulted at <http://bioloxia.uvigo.es/es/docencia/examenes>

Students who take this subject are required to show responsible and honest conduct. Any form of fraud (copying and/or plagiarism) intended to falsify the level of knowledge or skill reached by a student in any type of test, report or work designed for this purpose is considered inadmissible. This willful conduct will be penalized with the firmness and rigor established by current regulations and may lead to the suspension of the subject for an entire course. An internal record of these actions will be kept, therefore, in the event of recidivism, the rectory is requested to open a disciplinary file.

Sources of information

Basic Bibliography

- Aguiló Alonso, M. et al., **Guía para la elaboración de estudios del medio físico: contenido y metodología**, 4ª reimpr., Ministerio de Medio Ambiente,, 2000
- Arce Ruiz, R.M., **La evaluación de impacto ambiental en la encrucijada: Los retos del futuro**, Ecoiuris, 2002
- Canter, L. W., **Manual de evaluación de impacto ambiental: técnicas para la elaboración de los estudios de impacto**, McGraw-Hill, 1998
- Conesa Fernández-Vítora, V., **Guía metodológica para la evaluación del impacto ambiental**, 3ª ed, Mundi-Prensa, 2003
- Garmendia, A., Salvador, A., Crespo, C., Garmendia, L., **Evaluación de Impacto ambiental**, Pearson, Prentice Hall, 2005
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- Asociación Española de Evaluación de Impacto Ambiental (EIA): <http://www.eia.es>,
Evaluación de Impacto Ambiental (legislación): <http://www.miliarium.com/Paginas/Leyes/eia/eia.htm>,
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- de Tomás Sánchez, J.E., **Tres décadas de la evaluación del impacto ambiental en España. Revisión, necesidad y propuestas para un cambio de paradigma**, 2014
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- Treweek, J., **Ecological impact assessment**, John Wiley & Sons, 2009
- Bautista, L.M., García, J.T., Calmaestra, R.G., Palacín, C., Martín, C.A., Morales, M.B., Bonal, R., **Effect of weekend road traffic on the use of space by raptors**, Conservation Biology, 2004
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- Ministerio de Medio Ambiente, **Libro blanco de la educación ambiental en España en pocas palabras**, Gestión y Estudios Ambientales, S. C. L., 1999
- Bergström, L., Kautsky, L., Malm, T., Rosenberg, R., Wahlberg, M., Capetillo, N.A., Wilhelmsson, D., **Effects of offshore wind farms on marine wildlife-a generalized impact assessment**, 9, Environmental Research Letters, 2014
- Hawkins, A.D., Pembroke, A.E., Popper, A.N., **Information gaps in understanding the effects of noise on fishes and invertebrates**, 25, Review in Fish Biology and Fisheries, 2015
- ### Complementary Bibliography
- Glasson, J.; Therivel, R.; Chadwick, A., **Introduction to environmental impact assessment**, 2ª ed, Spon Press, 1999
- García Ureta, A., **Comentarios sobre la ley 21/2013, de evaluación ambiental**, 194, Revista de Administración Pública, 2014
- Vicente Davila, F., **Evaluación de impacto ambiental transfronteriza entre España y Portugal**, 2014
- Fahrig, L., Rytwinski, T., **Effects of roads on animal abundance: an empirical review and synthesis**, 14, Ecology and Society, 2009
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- Bailey, H., Brookes, K.L., Thompson, P.M., **Assessing environmental impacts of offshore wind farms: lessons learned and recommendations for the future**, 10, Aquatic Biosystems, 2014
- <https://www.miteco.gob.es/es/calidad-y-evaluacion-ambiental/temas/evaluacion-ambiental/>,

Recommendations

Subjects that continue the syllabus

Drafting and execution of projects/V02G030V01801

Subjects that are recommended to be taken simultaneously

Environmental analysis and diagnosis/V02G030V01902

Pollution/V02G030V01906

Management and Conservation of spaces/V02G030V01910

Subjects that it is recommended to have taken before

Ecology I/V02G030V01501

Ecology II/V02G030V01601
