



(*)Facultade de Bioloxía

Presentación

<http://bioloxia.uvigo.es/en/faculty/presentation>

Dean Team

(*)
<http://bioloxia.uvigo.es/gl/facultade/equipo-decanal>

Web

<http://bioloxia.uvigo.es/en/>

Grado en Biología

Subjects

Year 4th

Code	Name	Quadmester	Total Cr.
V02G030V01801	Drafting and execution of projects	2nd	6
V02G030V01901	Agri-food analysis and diagnostic	1st	6
V02G030V01902	Environmental analysis and diagnosis	1st	6
V02G030V01903	Clinical diagnosis and analysis	1st	6
V02G030V01904	Environmental impact evaluation	1st	6
V02G030V01905	Biodiversity: management and conservation	1st	6
V02G030V01906	Pollution	2nd	6
V02G030V01907	Animal production	1st	6
V02G030V01908	Microbial Production	1st	6
V02G030V01909	Plant Production	1st	6
V02G030V01910	Management and Conservation of spaces	1st	6
V02G030V01911	Quality management and control	1st	6
V02G030V01981	Internships	2nd	6
V02G030V01991	Final Year Dissertation	2nd	18

IDENTIFYING DATA				
Drafting and execution of projects				
Subject	Drafting and execution of projects			
Code	V02G030V01801			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	4th	2nd
Teaching language	Spanish			
Department				
Coordinator	Gallego Veigas, Pedro Pablo Alonso Rodríguez, José Antonio			
Lecturers	Alonso Rodríguez, José Antonio Barreal Modroño, M. Esther Díaz Vilariño, Lucía Gallego Veigas, Pedro Pablo González Cespón, José Luis Pedrol Bonjoch, María Nuria			
E-mail	jaalonso@uvigo.es pgallego@uvigo.es			
Web				
General description	This subject will enter to the student in the methodology, direction, management and organisation of projects of investigation/company within the scope of the Biology. After studying the subject, the student owes to be able to draft, and schedule projects of investigation/company related with the Biology. Schedule of kinds: Available in http://bioloxia.uvigo.es/*ge/*docencia/schedules			

Training and Learning Results				
Code				
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).			
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.			
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.			
C10	Analysing and assessing the adaptation of living beings to the environment.			
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.			
D3	Development of oral and writting communication abilities			
D4	Acquisition of foreign language knowledge related to the study field			

Expected results from this subject				
Expected results from this subject	Training and Learning Results			
Know the professional competitions that the title and the legislation award to the Graduated in Biology.	A2	B7	C14	
Know the typology of projects and own studies of the professional fields of the biologist.		B4		
		B5		
Know and handle the concepts and the relative terminology to the Editorial and Execution of Projects.		B2	C10	
			C13	
Obtain information and interpret results of projects.	A3	B2	C13	

Know the methods of management and evaluation of projects.		B2	
		B4	
Know, understand and apply the relative valid legislation to the management, evaluation and execution of projects.	A2	B2	
		B7	
Know use the general methodology stop the editorial and manufacture of projects and studies.	A4	B4	C12 C13
Know the basic concepts of economy stop the realization of projects and studies.	A2		
Comprise the developmental phases of one project elaborating *cronogramas, studies of feasibility and of *rendibilidade.	A2		C10 C14
Apply knowledges and relative technology to the Editorial and Execution of Projects in aspects related with the development and implantation of the systems of management.	A2		C14
Take part in the direction, editorial and execution of projects.	A2 A3 A4	B4	C12 C13
Comprise the social projection of the Editorial and Execution of Projects and his repercussion in the professional exercise.	A2 A4	B2	C10 C14
Apply knowledges of Editorial and Execution of Projects for *asesorar, supervise and *peritar on scientific aspects-technical, ethical, legal and partner-economic related with the Biology.			C14 D3 D4

Contents

Topic	
Block 0	Presentation of the subject
Block 1.	Competitions *profesionales of the biologist. Projects of study in biology: - professional Competitions of the biologist. - Documents *y Studios: *valoracions, and *licitacions public in biology. - *Propiedad Industrial and intellectual: companies of technological base. *Emprendimiento, innovation *y *autoempleo.
Block 2.	Practical methodology stop the manufacture of projects and studies. - Projects. Definition and structure. - The memory. Structure and index by heart. Activity and *diagrama of the process. Purpose and range. Data of identification. Description of functional blocks. Application of the legislation. Conclusions. - Principles of representation in projects. Typology of the representation: dimension and relation. Sizes of blocks of title and scales. *Plegado Of formats the The4. - Criteria stop the manufacture of the representation of biological activities. Diagrams of principle. - Budget, assessment of the project. - Planning of projects. *Diagrama Of *Gantt - oral Presentation of the project.

Planning

	Class hours	Hours outside the classroom	Total hours
Introductory activities	2	0	2
Lecturing	11	11	22
Practices through ICT	8	8	16
Collaborative Learning	8	16	24
Seminars	9	9	18
Report of practices, practicum and external practices	0	20	20
Project	0	20	20
Objective questions exam	2	6	8
Presentation	6	14	20

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Introductory activities	Presentation *amena of the teaching guide, detailing the specialization of the teaching staff and his relation with the thematic blocks. *Expoñense The thematic of work and *establecense the groups. Also it explains the system of evaluation.
Lecturing	Sessions of *docencia theoretical where it/to professor/offers it a general vision of the subject to treat, indicating the concepts pin stop his understanding.

Practices through ICT	Activity of acquisition of knowledges, basic skills and handle of specific programs of the different *apartados of the project.
Collaborative Learning	(*)Descripción e *desarrollo dun proxecto multidisciplinar (con alumnos doutras titulacións). Empregaranse metodoloxías como *Design *Thinking, Aprendizaxe en Servizo e Aprendizaxe Baseada en Problemas para deseñar o proxecto.
Seminars	Sessions of handle of real documents so that they know the typology of the main projects within the scope of the biology.

Personalized assistance

Methodologies	Description
Seminars	There will be different seminars that will include a part of theory and another of group practices.
Practices through ICT	Different practices will be carried out in the classroom in individual format and in small groups, supervised by the teachers of the subject.

Assessment

	Description	Qualification	Training and Learning Results			
Report of practices, practicum and external practices	The matter students in small groups they will present to memory project of biology. Solution problem. 35% Design Thinking Methodology 10% Learning service Methodology 15% Also carried out small works oriented teachers seminars. 10%	35	A2 A3 A4	B2 B4 B5 B7	C10 C12 C13 C14	D3 D4
Project	(*)Os alumnos da materia, en grupos pequenos, realizan un proxecto de actividade para deseñar a actividade produtiva relacionada co ámbito biolóxico	35				
Objective questions exam	Proofs for evaluation skills acquired including questions de resposta curta on works made.	10		B5 B7	C10 C14	
Presentation	The students, in multidisciplinary groups (engineers, humanities and/or economists) will present the complete project in a professional day.	20	A2 A3 A4	B2 B4 B5 B7	C10 C12 C13 C14	D3 D4

Other comments on the Evaluation

To pass the course the student need to obtain in each one of the 4 proofs, at least a 40 % of the total of the grade global of that evaluation item.

In case to get more than 5 poing in all the global grade will be the sum prorrateada, depending on the percentages described for each of the 4 evaluation items.

The course will be considered as SUSPENSO (no pass) when it do not reach said limit in all or some of the evaluation items, or in case the global grade do not reach the 5. In this case:

- 1.- In the record appear SUSPENSO with the grade drop that obtained in the proofs that did pass the limit or with the corresponding global note.
- 2.- The student get less than five (up to ten) the parts that did not reach the minimum in the second announcement. The rest of the parts save until the following announcement, as long as they get at least the 5 points (up to ten).

Each individual examination will have a factor of ponderation on the project.

The dates of *presentation of the memory and of project can be consulted in the platform MooVi.

The dates of the exams can consult in the following link: <http://bioloxia.uvigo.es/es/docencia/examenes>

Sources of information

Basic Bibliography

Complementary Bibliography

Navas López, J.A. y Guerras Marín, L.A., **La Dirección Estratégica de la Empresa. Teoría y Aplicaciones**, 2007, www.biologosdegallicia.org,
Correa, I., **Manual de licitaciones públicas**, 2002,
Palomar Olmeda, A., **Guía de concursos y licitaciones**, 2002,
Camprubí i García, Pere, **La profesión de Biólogo**, 1997,

PmBok Guide, **A guide to the Project Management Body of Knowledge**, 2014,

Antinio Colmenar, **Gestión de proyectos con microsoft project 2010**, 2011,

Harold Kerzner, **Project management. A systems approach to planning, scheduling and controlling**, 2011,

González Cespón, José Luis, **Apuntes de la materia**,

Recommendations

Subjects that continue the syllabus

Final Year Dissertation/V02G030V01991

Subjects that are recommended to be taken simultaneously

Final Year Dissertation/V02G030V01991

Subjects that it is recommended to have taken before

Quality management and control/V02G030V01911

IDENTIFYING DATA				
Análise e diagnóstico agroalimentario				
Subject	Análise e diagnóstico agroalimentario			
Code	V02G030V01901			
Study programme	Grao en Bioloxía			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4	1c
Teaching language	Castelán Galego			
Department	Bioloxía funcional e ciencias da saúde Química analítica e alimentaria			
Coordinator	Iglesias Blanco, Raúl			
Lecturers	Gago Martínez, Ana Iglesias Blanco, Raúl Leao Martins, Jose Manuel			
E-mail	rib@uvigo.es			
Web				
General description	Materia eminentemente práctica deseñada para que o alumno adquira as competencias básicas no campo da detección, identificación e control de riscos alimentarios de orixe biolóxica. Tras unha breve introdución teórica na que se presentarán os aspectos fundamentais e importancia da seguridade alimentaria e trazabilidade, se realizarán unha serie de técnicas de referencia empregadas na análise de riscos microbiolóxicos, parasitolóxicos e químicos (de orixe biolóxica) presentes en alimentos. A formación non presencial estará orientada á interpretación dos resultados analíticos obtidos durante as sesións prácticas, á resolución de casos prácticos similares aos que se poden presentar nun laboratorio de análise agroalimentaria, e/ou á busca de información complementaria que permita ao alumno ter unha visión integral da disciplina.			
O horario da materia pode consultarse no seguinte enlace: http://bioloxia.uvigo.es/gl/docencia/horarios				

Resultados de Formación e Aprendizaxe	
Code	
A1	Que os estudantes demostren posuír e comprender coñecementos nunha área de estudo que parte da base da educación secundaria xeral e adoita atoparse a un nivel que, malia se apoiar en libros de texto avanzados, inclúe tamén algúns aspectos que implican coñecementos procedentes da vangarda do seu campo de estudo.
A2	Que os estudantes saiban aplicar os seus coñecementos ó seu traballo ou vocación dunha forma profesional e posúan as competencias que adoitan demostrarse por medio da elaboración e defensa de argumentos e a resolución de problemas dentro da súa área de estudo.
A3	Que os estudantes teñan a capacidade de reunir e interpretar datos relevantes (normalmente dentro da súa área de estudo) para emitir xuízos que inclúan unha reflexión sobre temas relevantes de índole social, científica ou ética.
A4	Que os estudantes poidan transmitir información, ideas, problemas e solución a un público tanto especializado como non especializado.
A5	Que os estudantes desenvolvan aquelas habilidades de aprendizaxe necesarias para emprender estudos posteriores cun alto grao de autonomía.
B2	Capacidade de lectura e análise de documentos científicos e de interpretar datos e informacións, extraendo o esencial do accesorio ou secundario, e de fundamentar debidamente as pertinentes conclusións.
B3	Adquirir coñecementos xerais das materias básicas da bioloxía, tanto a nivel teórico como experimental, sen descartar unha maior especialización en materias que se orientan a un ámbito profesional concreto.
B4	Capacidade para manexar ferramentas experimentais, incluíndo a instrumentación científica e informática, que apoién a busca de solucións a problemas relacionados co coñecemento básico da bioloxía e con aqueles propios dun contexto laboral.
B7	Saber recompilar información sobre temas de interese de ámbito biolóxico, analizala e emitir xuízos críticos e razoados sobre estes, incluíndo cando sexa precisa a reflexión sobre aspectos sociais e/ou éticos relacionados coa temática.
B10	Desenvolver as capacidades analíticas e de abstracción, a intuición e o pensamento lóxico e rigoroso a través do estudo da bioloxía e as súas aplicacións.
B11	Saber comunicar a todo tipo de audiencias (especializadas ou non) de xeito claro e preciso coñecementos, metodoloxías, ideas, problemas e solucións relacionadas con distintos ámbitos da bioloxía.
B12	Capacidade para identificar as súas propias necesidades formativas no campo da bioloxía e en ámbitos laborais concretos, e de organizar a súa aprendizaxe cun alto grao de autonomía en calquera contexto.
C3	Identificar, analizar e caracterizar mostras de orixe biolóxica, incluídas as de orixe humana, e as súas posibles anomalías
C4	Isolar, analizar e identificar biomoléculas, virus, células, tecidos e órganos
C5	Cultivar microorganismos, células, tecidos e órganos
C8	Avaliar o funcionamento de sistemas fisiolóxicos interpretando parámetros vitais
C14	Realizar análises, control e depuración das augas

C18	Producir, transformar, controlar e conservar produtos agroalimentarios
C19	Identificar, xerir e comunicar riscos agroalimentarios e ambientais
C21	Realizar e interpretar bioensaios e diagnósticos biolóxicos
C22	Identificar, caracterizar e utilizar bioindicadores
C25	Obter información, desenvolver experimentos e interpretar os resultados
C29	Asesorar e peritar sobre aspectos científico-técnicos, éticos, legais e socio-económicos relacionados coa bioloxía
C31	Coñecer e manexar instrumentación científico-técnica
C32	Capacidade para coñecer e manexar os conceptos e a terminoloxía propios ou específicos
C33	Capacidade para comprender a proxección social da bioloxía
D1	Desenvolver a capacidade de análise e síntese
D2	Adquirir a capacidade de organizar e planificar as tarefas e o tempo
D3	Desenvolver habilidades de comunicación oral e escrita
D4	Adquirir coñecementos de lingua extranxeira relativos ao ámbito de estudo
D5	Empregar recursos informáticos relativos ao ámbito de estudo
D6	Saber buscar e interpretar información procedente de fontes diversas
D7	Resolver problemas e tomar decisións de forma efectiva
D8	Desenvolver a capacidade de aprendizaxe autónoma
D9	Traballar en colaboración ou formando equipos de carácter interdisciplinar
D10	Desenvolver o razoamento crítico
D11	Adquirir un compromiso ético coa sociedade e a profesión
D14	Adquirir habilidades nas relacións interpersoais
D15	Desarrollar a creatividade, a iniciativa e o espírito emprendedor
D16	Asumir un compromiso coa calidade
D17	Desenvolver a capacidade de autocrítica

Resultados previstos na materia

Expected results from this subject	Training and Learning Results			
Coñecer os principais riscos que comprometen a seguridade alimentaria	A1	B2	C3	D1
	A2	B3	C4	D2
	A4	B7	C14	D3
	A5	B11	C19	D4
		B12	C29	D5
			C32	D6
				D7
				D8
				D9
				D14
Coñecer a importancia dos sistemas de trazabilidade na industria alimentaria	A1	B3	C18	D11
	A2	B7	C19	D16
	A5	B12	C29	
			C32	
Coñecer os principios básicos da análise e diagnóstico agroalimentario	A1	B2	C3	D1
	A2	B3	C4	D2
	A3	B7	C5	D3
	A4	B11	C14	D4
	A5	B12	C18	D5
			C19	D6
			C25	D7
			C32	D8
				D9
				D14
				D16
				D17
Coñecer os distintos tipos de mostras agroalimentarias, as técnicas de mostraxe e os principais métodos analíticos que se empregan nos laboratorios de análise e diagnóstico agroalimentario	A1	B2	C3	D1
	A2	B3	C4	D2
	A3	B4	C5	D3
	A4	B7	C14	D4
	A5	B11	C19	D5
		B12	C21	D6
			C22	D7
			C25	D8
			C31	D9
				D14
				D16
				D17

Adquirir os coñecementos necesarios para interpretar correctamente as probas analíticas	A1	B2	C3	D1
	A5	B3	C4	D2
		B4	C14	D3
		B7	C19	D4
		B10	C21	D5
		B12	C22	D6
			C31	D7
			C32	D8
				D9
				D14
				D16
				D17
Coñecer a lexislación relativa a seguridade alimentaria e análise e diagnóstico agroalimentario	A1	B3	C18	D5
	A3	B7	C19	D6
	A5	B12	C22	D8
			C29	D10
			C32	D11
				D16
Aplicar o coñecemento da análise e diagnóstico agroalimentario para illar, identificar, manexar e analizar espécimes, mostras e substancias de orixe biolóxica que serven de alimentos, ou están presentes neles constituíndo perigos e/ou defectos alimentarios, e caracterizar os seus constituíntes celulares e/ou moleculares.	A2	B2	C3	D1
	A3	B3	C4	D2
	A4	B4	C5	D3
	A5	B7	C14	D4
		B10	C19	D5
		B11	C21	D6
		B12	C22	D7
			C25	D8
			C31	D9
				D10
				D11
				D14
				D16
				D17
Analizar e interpretar o funcionamento dos seres vivos, no que se refire ás respostas do ser humano aos perigos alimentarios de orixe biolóxica, e destes últimos aos distintos tratamentos de transformación alimentaria.	A2	B2	C8	D1
	A3	B3	C21	D2
	A5	B4	C25	D3
		B7		D4
		B10		D5
		B12		D6
				D7
				D8
				D9
				D10
				D11
				D14
				D16
				D17
Aplicar coñecementos e técnicas propios da análise e diagnóstico agroalimentario para mellorar a xestión do medio no que se refire ao control de determinados perigos biolóxicos	A2	B2	C14	D1
	A3	B3	C18	D2
	A5	B4	C19	D3
		B7	C21	D4
		B10	C22	D5
		B12		D6
				D7
				D8
				D9
				D14
Aplicar coñecementos e tecnoloxía relativos á análise e diagnóstico agroalimentario en aspectos relacionados coa produción, explotación, análise e diagnóstico de procesos e recursos biolóxicos relacionados coa industria e a seguridade alimentarias.	A2	B2	C3	D1
	A3	B3	C14	D2
	A5	B4	C18	D3
		B7	C19	D4
		B10	C22	D5
		B12		D6
				D7
				D8
				D9
				D14
				D15
				D17

Obter información, desenvolver experimentos e interpretar resultados no campo da análise e diagnose agroalimentaria	A3 A5	B2 B4 B10	C3 C4 C5 C18 C19 C21 C22 C25 C31	D1 D2 D4 D5 D6 D7 D10 D16
Comprender a proxección social da análise e diagnóstico agroalimentario e a súa repercusión no exercicio profesional	A2 A5	B7 B12	C19 C33	D1 D2 D3 D4 D5 D6 D7 D8 D9 D14 D16 D17
Aplicar coñecementos de análise e diagnóstico agroalimentario para asesorar, supervisar e peritar sobre aspectos científico-técnicos, éticos, legais e socio-económicos relacionados coa seguridade alimentaria	A2 A3 A5	B2 B3 B7 B10 B12	C18 C19 C29	D1 D2 D3 D4 D5 D6 D7 D8 D9 D14 D16 D17

Contidos

Topic	
Introdución á análise e diagnóstico agroalimentario	Seguridade alimentaria e trazabilidade Perigos/riscos e defectos alimentarios O sistema APPCC O Codex Alimentarius
Riscos alimentarios biolóxicos (I)	Microorganismos patóxenos transmitidos por alimentos Microorganismos que condicionan a calidade alimentaria Técnicas de detección e identificación Lexislación
Riscos alimentarios biolóxicos (II)	Parásitos zoonóticos transmitidos por alimentos Parásitos que condicionan a calidade alimentaria Técnicas de detección e identificación Lexislación
Riscos alimentarios químicos	Contaminantes inorgánicos Contaminantes orgánicos (naturais e antropoxénicos) Técnicas de detección Lexislación

Planificación

	Class hours	Hours outside the classroom	Total hours
Lección maxistral	6	8	14
Prácticas de laboratorio	38	38	76
Estudo de casos	4	30	34
Exame de preguntas obxectivas	1	16	17
Exame de preguntas de desenvolvemento	1	8	9

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Metodoloxía docente

Description

Lección maxistral	Clases de 50 min nas que se introducirá o alumno no campo da seguridade alimentaria, presentando os conceptos básicos relacionados coa detección e control de perigos/riscos e defectos de orixe biolóxica en alimentos
Prácticas de laboratorio	Sesións de prácticas en laboratorio orientadas á aprendizaxe dunha serie de técnicas analíticas que permiten a detección e identificación de microorganismos, parasitos e substancias contaminantes de orixe biolóxica en diversas mostras alimentarias. Durante, ou ao final das sesións prácticas, os alumnos deberán resolver, mediante traballo autónomo, unha serie de cuestións formuladas polos profesores en relación ás técnicas analíticas empregadas e aos riscos alimentarios detectados. A resolución de cuestionarios e/ou realización de breves informes permitirá ao alumno completar a súa formación presencial e adquirir unha visión integral da disciplina
Estudo de casos	Os estudantes recibirán instrucións e unha serie de casos prácticos relacionados coa análise de alimentos, que deberán resolver traballando en pequenos grupos. As sesións dedicadas para esta actividade utilizaranse para supervisar a evolución do traballo realizado polos diferentes grupos, e se é o caso, reorientar ao alumnado (sesión de control intermedia; 1 h), así como para a presentación e defensa dos casos, unha vez resoltos (3 h).

Atención personalizada

Methodologies	Description
Estudo de casos	O profesorado orientará ao alumnado sobre as principais tarefas a realizar na actividade de seminarios, e comprobará que o traballo en grupo vai na dirección axeitada e estase a realizar sen problemas. Cando isto non sexa así, procederase a reconducir a situación.
Prácticas de laboratorio	O profesorado supervisará o traballo de laboratorio dos alumnos de cada grupo, correxindo os erros detectados no desempeño das técnicas e atendendo todas as cuestións que poidan surdir ao longo das sesións prácticas.
Lección maxistral	O profesorado tentará facer as clases maxistráis participativas para que os alumnos poidan plantexar preguntas e, incluso, breves debates.

Avaliación

	Description	Qualification	Training and Learning Results			
Prácticas de laboratorio	Avaliaranse a actitude e as capacidades e destrezas adquiridas polos alumnos durante as prácticas, así como a capacidade para redactar breves informes e/ou dar respostas axeitadas e ben argumentadas a cuestionarios formulados en relación coas actividades realizadas durante estas sesións.	40	A1	B2	C3	D1
			A2	B3	C4	D2
			A3	B4	C5	D3
			A4	B7	C8	D4
			A5	B10	C19	D5
				B11	C21	D8
				B12	C22	D10
					C25	D11
					C29	D15
					C31	D16
					C32	D17
					C33	
Estudo de casos	Avaliaranse os avances alcanzados ata a sesión de control intermedia no que se refire á resolución dos casos prácticos expostos, e a redacción, presentación e defensa final dos casos resoltos.	20	A1	B2	C3	D1
			A2	B3	C4	D2
			A3	B7	C14	D3
			A4	B11	C18	D4
			A5	B12	C19	D5
					C21	D6
					C22	D7
					C29	D8
					C31	D9
					C32	D10
					C33	D14
						D15
						D17
Exame de preguntas obxectivas	Este exame, que incluírá preguntas obxectivas (preguntas tipo test e preguntas de resposta curta), será parte dunha Proba final integradora, que supoñerá un 40% da nota final da materia. Na devandita proba avaliaranse os coñecementos adquiridos polos alumnos ao longo das sesións teóricas e prácticas da materia, e a capacidade para interpretar e argumentar correctamente unha análise de alimentos.	26.8	A1	B2	C3	D1
			A2	B3	C4	D3
			A4	B10	C14	D7
				B11	C18	D10
					C19	D16
					C22	
					C29	
					C31	
					C32	
					C33	

Exame de preguntas de desenvolvemento	Este exame, que tamén formará parte da Proba final integradora que supoñerá o 40% da nota final da materia, avaliará a capacidade do alumnado para resolver diversos casos ou situacións prácticas relacionadas coa análise agroalimentaria de forma argumentada.	13.2	A1 B2 C3 D1 A2 B3 C4 D3 A4 B10 C14 D7 B11 C18 D10 C19 D16 C22 C29 C31 C32 C33
---------------------------------------	---	------	--

Other comments on the Evaluation

1. Dado que as actividades de formación e avaliación programadas dentro das **Prácticas de Laboratorio** e do **Estudo de casos** (incluída a sesión de control intermedio) están deseñadas para formar ao alumnado en habilidades e competencias directamente relacionadas co exercicio da profesión no campo da análise e diagnóstico agroalimentario, **a asistencia e participación do alumnado en ambas as actividades avaliáveis é obrigatoria, de tal maneira que a ausencia ou non realización inxustificada destas actividades impedirá superar a materia**. Por tanto, considerando a natureza práctica e os resultados de formación e aprendizaxe que se perseguen alcanzar con ambas as metodoloxías, o alumnado que opte pola modalidade de **avaliación global** tamén deberá realizar obrigatoriamente estas actividades.

2. **Para aprobar a materia será necesario alcanzar unha cualificación global final de 5,0 (sobre 10)**, unha vez sumadas as cualificacións ponderadas obtidas nas de Prácticas (40%), Estudo de casos (20%) e Proba final integradora (40%). Con todo, **para poder superar a materia, e poder sumar as cualificacións obtidas nas actividades de Prácticas e Estudo de casos, deberá alcanzarse unha nota mínima de 4,0 (sobre 10) en cada unha das partes (Química Analítica, Microbiología e Parasitología) que integrarán a Proba final**. Os alumnos que non cumpran este requisito na primeira oportunidade serán cualificados na acta coa nota máis alta alcanzada nas partes suspensas, e deberán repetir na **segunda oportunidade (xullo)** a proba relativa á parte ou partes nas que non alcanzasen o 4,0. Loxicamente, os alumnos que se atopen nesta situación conservarán a nota da/s parte/s superada/s ($\geq 4,0$) en primeira oportunidade e das Prácticas e Estudo de casos, para telas en conta na nota final. Na segunda oportunidade, será tamén imprescindible alcanzar o 4,0 en todas as partes obxecto de recuperación.

As datas da proba final integradora pódense consultar na seguinte ligazón: <http://bioloxia.uvigo.es/es/docencia/examen.es>.

Bibliografía. Fontes de información

Basic Bibliography

Doyle, M.P., Díez-González, F., Hill, C., **Food Microbiology. Fundamentals and Frontiers.**, 5ª ed., ASM Press, 2019
Shibamoto, T., Bjeldanes, L., **Introduction to food toxicology**, 2nd. ed., Academic Press, 2009
Labbé, R.G., García, S., **Guide to Foodborne Pathogens**, 2nd ed., Willey, 2013
Xiao, L., Ryan, U., Feng, Y., **Biology of Foodborne Parasites**, CRC Press, 2015

Complementary Bibliography

Montville, T.J., Matthews, K.R., Kalmia, E., Kniel, K.E., **Food Microbiology**, 4th ed., ASM Press, 2017
Lawley, R., Curtis, L., Davies, J., **The food safety hazard guidebook**, 2nd Ed., RSC Publishing, 2012
Juneja, V.K., Sofos, J.N., **Pathogens and toxins in foods. Challenges and Interventions**, ASM Press, 2009
Tennant, D.R., **Food chemical risk analysis**, Blackie-Chapman & Hall, 1997
International Commission on Microbiological Specifications of Foods (ICMSF), **Microorganisms in Food 1-8**, 1996
U.S. Food and Drug Administration, **FDA's Bacteriological Analytical Manual (BAM)**,
Ortega, Y.R., **Foodborne parasites**, Springer, 2009
Agencia Española de Seguridad Alimentaria y Nutrición (AECOSAN),
https://www.aesan.gob.es/AECOSAN/web/home/aecosan_inicio.htm,
European Food Safety Authority (EFSA), <https://www.efsa.europa.eu/en>,
CODEX ALIMENTARIUS (International Food Standards), <http://www.fao.org/fao-who-codexalimentarius/es/>,
Gajadhar, A., **Foodborne parasites in the food supply web: Occurrence and control**, 1st Ed., Woodhead Publishing, 2015
Ryan, K.J., N. Ahmad, J.A. Alspaugh, et al., **Sherris & Ryan's Medical Microbiology**, 8th, Mc Graw Hill, 2022

Recomendacións

Subjects that are recommended to be taken simultaneously

Análise e diagnóstico clínico/V02G030V01903
Análise e diagnóstico medioambiental/V02G030V01902

Subjects that it is recommended to have taken before

Inmunoloxía e parasitoloxía/V02G030V01604

IDENTIFYING DATA				
Análise e diagnóstico medioambiental				
Subject	Análise e diagnóstico medioambiental			
Code	V02G030V01902			
Study programme	Grao en Bioloxía			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4	1c
Teaching language	Castelán			
Department				
Coordinator	Delgado Núñez, Cristina			
Lecturers	Calviño Cancela, María Delgado Núñez, Cristina Muñoz Sobrino, Castor Noguera Amoros, Jose Carlos Soto González, Benedicto			
E-mail	cdelgado.cristina@gmail.com			
Web				
General description	Esta materia pretende suministrar os coñecementos necesarios e ferramentas básicas para a análise e diagnóstico do medioambiente. Horarios: http://bioloxia.uvigo.es/es/docencia/horarios/			

Resultados de Formación e Aprendizaxe

Code	
A1	Que os estudantes demostren posuír e comprender coñecementos nunha área de estudo que parte da base da educación secundaria xeral e adoita atoparse a un nivel que, malia se apoiar en libros de texto avanzados, inclúe tamén algúns aspectos que implican coñecementos procedentes da vangarda do seu campo de estudo.
A2	Que os estudantes saiban aplicar os seus coñecementos ó seu traballo ou vocación dunha forma profesional e posúan as competencias que adoitan demostrarse por medio da elaboración e defensa de argumentos e a resolución de problemas dentro da súa área de estudo.
A3	Que os estudantes teñan a capacidade de reunir e interpretar datos relevantes (normalmente dentro da súa área de estudo) para emitir xuízos que inclúan unha reflexión sobre temas relevantes de índole social, científica ou ética.
A4	Que os estudantes poidan transmitir información, ideas, problemas e solución a un público tanto especializado como non especializado.
A5	Que os estudantes desenvolvan aquelas habilidades de aprendizaxe necesarias para emprender estudos posteriores cun alto grao de autonomía.
B2	Capacidade de lectura e análise de documentos científicos e de interpretar datos e informacións, extraendo o esencial do accesorio ou secundario, e de fundamentar debidamente as pertinentes conclusións.
B3	Adquirir coñecementos xerais das materias básicas da bioloxía, tanto a nivel teórico como experimental, sen descartar unha maior especialización en materias que se orientan a un ámbito profesional concreto.
B4	Capacidade para manexar ferramentas experimentais, incluíndo a instrumentación científica e informática, que apoién a busca de solucións a problemas relacionados co coñecemento básico da bioloxía e con aqueles propios dun contexto laboral.
B7	Saber recompilar información sobre temas de interese de ámbito biolóxico, analizala e emitir xuízos críticos e razoados sobre estes, incluíndo cando sexa precisa a reflexión sobre aspectos sociais e/ou éticos relacionados coa temática.
B10	Desenvolver as capacidades analíticas e de abstracción, a intuición e o pensamento lóxico e rigoroso a través do estudo da bioloxía e as súas aplicacións.
B11	Saber comunicar a todo tipo de audiencias (especializadas ou non) de xeito claro e preciso coñecementos, metodoloxías, ideas, problemas e solucións relacionadas con distintos ámbitos da bioloxía.
B12	Capacidade para identificar as súas propias necesidades formativas no campo da bioloxía e en ámbitos laborais concretos, e de organizar a súa aprendizaxe cun alto grao de autonomía en calquera contexto.
C3	Identificar, analizar e caracterizar mostras de orixe biolóxica, incluídas as de orixe humana, e as súas posibles anomalías
C5	Cultivar microorganismos, células, tecidos e órganos
C8	Avaliar o funcionamento de sistemas fisiolóxicos interpretando parámetros vitais
C13	Avaliar os impactos ambientais. Diagnosticar e solucionar problemas medioambientais
C14	Realizar análises, control e depuración das augas
C19	Identificar, xerir e comunicar riscos agroalimentarios e ambientais
C21	Realizar e interpretar bioensaos e diagnósticos biolóxicos
C22	Identificar, caracterizar e utilizar bioindicadores
C25	Obter información, desenvolver experimentos e interpretar os resultados
C29	Asesorar e peritar sobre aspectos científico-técnicos, éticos, legais e socio-económicos relacionados coa bioloxía
C31	Coñecer e manexar instrumentación científico-técnica

C32	Capacidade para coñecer e manexar os conceptos e a terminoloxía propios ou específicos
C33	Capacidade para comprender a proxección social da bioloxía
D1	Desenvolver a capacidade de análise e síntese
D2	Adquirir a capacidade de organizar e planificar as tarefas e o tempo
D3	Desenvolver habilidades de comunicación oral e escrita
D4	Adquirir coñecementos de lingua estranxeira relativos ao ámbito de estudo
D5	Empregar recursos informáticos relativos ao ámbito de estudo
D6	Saber buscar e interpretar información procedente de fontes diversas
D7	Resolver problemas e tomar decisións de forma efectiva
D8	Desenvolver a capacidade de aprendizaxe autónoma
D9	Traballar en colaboración ou formando equipos de carácter interdisciplinar
D10	Desenvolver o razoamento crítico
D11	Adquirir un compromiso ético coa sociedade e a profesión
D12	Comportarse con respecto á diversidade e a multiculturalidade
D13	Sensibilización polos temas medioambientais
D14	Adquirir habilidades nas relacións interpersoais
D15	Desarrollar a creatividade, a iniciativa e o espírito emprendedor
D16	Asumir un compromiso coa calidade
D17	Desenvolver a capacidade de autocritica
D18	Desenvolver a capacidade de negociación

Resultados previstos na materia

Expected results from this subject	Training and Learning Results			
Coñecer os principios básicos da análise e diagnóstico ambiental	A1	B3 B4	C3	D8
			C5	D9
			C8	D10
			C13	D12
			C14	D13
			C19	D14
			C21	D15
			C22	
			C25	
			C29	
			C31	
			C32	
Coñecer os distintos tipos de mostras ambientais, as técnicas de mostraxe e os principais métodos analíticos que se empregan en análise e diagnóstico ambiental	B4		C3	D1
			C5	D2
			C8	D3
			C13	D4
			C14	D5
			C19	D6
			C21	D7
			C22	D8
			C25	D9
			C29	D10
			C31	D11
			C32	D12
				D13
				D14
				D15
				D16
				D17
				D18

Adquirir os coñecementos necesarios para interpretar correctamente as probas analíticas		B3 B4 B7 B10	C3 C5 C8 C13 C14 C19 C21 C22 C25 C29 C31 C32	D1 D2 D3 D4 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 D16 D17 D18
Coñecer a lexislación relativa a saúde e protección ambiental e análise e diagnóstico ambiental	A1		C29 C32 C33	D6
Aplicar o coñecemento de análise e diagnóstico ambiental para illar, identificar, manexar e analizar espécimes e mostras de orixe biolóxica	A2 A3	B4	C3 C5 C8 C13 C14 C19 C21 C22 C25 C29 C31 C32	D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D13 D15
Analizar e interpretar o funcionamento dos seres vivos	A1 A2 A3	B3 B4 B7 B10	C3 C8 C21 C22 C25 C29 C31 C32	D1 D6
Aplicar coñecementos e técnicas propios da análise e diagnóstico ambiental en diferentes procesos relacionados coa xestión do medio	A2	B3 B4 B10	C8 C13 C21 C29	D1 D4 D5 D7 D9 D15 D16
Aplicar coñecementos e tecnoloxía relativos á análise e diagnóstico ambiental en aspectos relacionados coa análise e diagnóstico de procesos e recursos biolóxicos	A2 A3		C8 C13 C21 C29	D1 D3 D4 D5 D6 D7 D9 D10 D12 D13 D15 D17
Obter información, desenvolver experimentos e interpretar resultados	A3 A5	B2 B3 B4 B7 B10 B12	C21 C25 C31 C32	D1 D6
Comprender a proxección social da análise e diagnóstico ambiental e a súa repercusión no exercicio profesional	A2		C33	D11 D16

Aplicar coñecementos de análise e diagnóstico ambiental para asesorar, supervisar e peritar sobre aspectos científico-técnicos, éticos, legais e socio-económicos relacionados cos seres vivos e medio	A2 A3 A4	C13 C29	D1 D3 D4 D5 D6 D7 D8 D10 D13 D15 D17
Coñecer e manexar os conceptos, terminoloxía e instrumentación científico-técnica relativos á análise e diagnóstico ambiental	A1 B3 B4 B11	C3 C5 C8 C13 C14 C19 C21 C22 C25 C29 C31 C32	D4 D5 D6 D7 D9

Contidos	
Topic	
Tema 1. Introducción xeral.	Deterioro ambiental, crecemento demográfico e cambio global. Concienciación en materia de medioambiente e desenvolvemento da lexislación ambiental.
Tema 2. Programas e redes de seguemento ambiental.	Toma de datos ambientais. Programas e redes en funcionamento, ámbito territorial (Xunta, Europa, ...) e enfoques.
Tema 3. Ferramentas de análises.	Metodoloxías xerais de análises e diagnóstico ambiental. Teledetección. Inventarios. Toma de datos de campo e indicadores ecolóxicos.
Tema 5. Análise e diagnóstico da biodiversidade e os hábitats.	Parámetros indicadores e estado da biodiversidade e os hábitats. Directiva hábitats. Seguemento e conservación. Biodiversidade e especies ameazadas.
Tema 4. Análise e diagnóstico da atmosfera, a auga e o solo.	Parámetros indicadores e estado da atmosfera, a auga e o solo. Atmosfera: liñas de actuación e normativa. Gases efecto invernadoiro e calidade do aire. Auga: xestión da auga, Directiva Marco da auga Europea. Demarcacións hidrográficas. Análises e diagnóstico ambiental. Calidade de solos: índices e indicadores
Tema 6: Análise e diagnóstico dos servizos ecosistémicos.	Parámetros indicadores e estado dos servizos ecosistémicos.
Prácticas	-Análise e diagnóstico de solos degradados. -Análise e diagnóstico de hábitats. -Análise e Diagnóstico Ambiental baseado en indicadores vexetais. -Análise e Diagnóstico Ambiental baseado en indicadores animais.

Planificación			
	Class hours	Hours outside the classroom	Total hours
Lección maxistral	12	36	48
Prácticas de laboratorio	45	9	54
Traballo tutelado	0	45	45
Debate	1	0	1
Resolución de problemas e/ou exercicios	2	0	2
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Metodoloxía docente	
	Description
Lección maxistral	Explicación dos conceptos fundamentais do temario co apoio de medios audiovisuais.
Prácticas de laboratorio	Os alumnos realizarán prácticas de laboratorio e de campo relacionadas coa mostraxe, tratamento e análise de diferentes mostras ambientais sometidas a diversas presións antropoxénicas, incluíndo solos, auga e organismos vivos, e se realizarán análises estadísticas cando corresponda. Realizarán tamén visitas a laboratorios de referencia.

Traballo tutelado	Os alumnos realizarán un traballo tutelado por diferentes profesores da materia sobre estudos de investigación xa publicados que discutirán de forma crítica en relación co seu plantexamento e metodoloxía
Debate	Os alumnos debatirán na aula sobre diferentes temas medioambientais incluíndo os temas dos traballos tutelados, facendo preguntas os seus propios compañeiros sobre os temas escollidos

Atención personalizada

Methodologies	Description
Lección maxistral	Atenderanse todas as cuestións plantexadas polos alumnos relativas aos contidos das sesións maxistrais nas mesmas sesións ou en tutorías.
Prácticas de laboratorio	Atenderanse todas as cuestións expostas polos alumnos relativas aos contidos das prácticas nas propias prácticas ou en tutorías.
Traballo tutelado	Atenderanse as cuestións expostas polos alumnos relativas aos contidos do traballo e en sesións explicativas sobre os mesmos desenvolvidas na aula ou en tutorías.

Avaliación

	Description	Qualification	Training and Learning Results			
Lección maxistral	Os contidos da lección maxistral evaluaranse mediante probas obxectivas con preguntas tipo test e de resposta curta, nun exame final escrito.	40	A1 A2 A3	B2 B3 C19 C21 C22 C29 C32	C3 C13 D10 D11 D13	D1
Prácticas de laboratorio	Valoraranse mediante preguntas obxectivas os coñecementos adquiridos en prácticas mediante preguntas en cuestionarios que deberán ser entregados o profesorado.	30	A2 A5	B3 B4 C3 C5 C8 C13 C14 C19 C21 C22 C25 C31 C32	D5 D7 D9 D10 D12 D13 D14 D15 D16	
Traballo tutelado	Os traballos tutelados evaluarase mediante a entrega dun primeiro borrador do traballo (con exposición oral) e dun traballo escrito. Valorarase a capacidade de análise, de síntese e de expresión, a relevancia da bibliografía consultada, así como o dominio dos temas tratados na asignatura.	20	A2 A3	B2 B4 C8 C21	D2	
Debate	Debatirase na aula sobre diferentes temas de actualidade e sobre os traballos tutelados presentados polos diferentes grupos.	10	A2 A3	B3 B4 C8 C21	D2	

Other comments on the Evaluation

A asistencia a todas as sesións prácticas e a entrega das memorias de prácticas e obrigatoria. Precísase alcanzar unha nota mínima de 5 en cada unha das calificacións (exame final, prácticas e traballo) para aprobar a asignatura. Se non se supera esa calificación nalguna das partes, a nota final será a que obteña nesa parte limitante.

En convocatorias diferentes á ordinaria, a avaliación será mediante a nota dun exame escrito pero o alumno terá que ter asistido a todas as sesións prácticas e entregado todos os traballos de prácticas e ter nota de mais de un 5 no traballo para poder aprobar a materia.

Somentes se gardarán as notas do traballo e cuestionarios de prácticas para a segunda convocatoria. Considerarase un N.P. cando o alumno non se presente ao exame escrito, independentemente de que teña presentado o traballo e cuestionarios.

Datos de exames: Pódense consultar no seguinte enderezo: <http://bioloxia.uvigo.es/es/docencia/examenes/>

No caso de que non se pudiera realizar os exames de maneira presencial optárase nesta materia, por unha avaliación non presencial con un exame escrito a realizar a través das plataformas da Universidade de Vigo ou un exame oral.

Bibliografía. Fontes de información

Basic Bibliography

Carretero Peña, A., **Aspectos ambientales. Identificación y evaluación**, 2ª edición, Aenor,

Capó, M., **Principios de ecotoxicología: Diagnóstico, tratamiento y gestión del medio ambiente**,

Darbra M., Ronza A., Casal J., Stojanovic T.A., Wooldridge C., **The Self Diagnosis Method: A new methodology to assess environmental management in sea ports**, Elsevier, 2004

Delgado C., Pardo I. & García L., **Diatom communities as indicators of ecological status in Mediterranean temporary streams (Balearic Islands, Spain)**, Elsevier, 2012

Complementary Bibliography

Aguiló Alonso, M. et al., **Guía para la elaboración de estudios del medio físico: contenido y metodologías.**, Ministerio de Medio Ambiente,

van de Bund, W.J. (ed.), **Water Framework Directive intercalibration technical report. Part 1: Rivers.**, JRC Scientific and Technical Reports,

Poikane, S. (ed.), **Water Framework Directive intercalibration technical report. Part 2: Lakes**, JRC Scientific and Technical Reports,

Newman, M.C., William Henry Clements, W. H. Boca Raton, **Ecotoxicology: a comprehensive treatment.**, CRC Press,

Sibly, R. M.; Walker, C. H, **Principles of ecotoxicology**, CRC,

Lal, R., **Soil Quality and Agricultural Sustainability**, Ann Arbor Press,

Sullivan, P., **El Manejo Sostenible de Suelos**, NCAT,

Recomendaciones

Subjects that are recommended to be taken simultaneously

Biodiversidade: Xestión e conservación/V02G030V01905

Avaliación de impacto ambiental/V02G030V01904

Xestión e conservación de espazos/V02G030V01910

Subjects that it is recommended to have taken before

Ecoloxía I/V02G030V01501

Ecoloxía II/V02G030V01601

IDENTIFYING DATA				
Análise e diagnóstico clínico				
Subject	Análise e diagnóstico clínico			
Code	V02G030V01903			
Study programme	Grao en Bioloxía			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4	1c
Teaching language	Castelán Galego			
Department	Bioquímica, xenética e inmunoloxía			
Coordinator	Magadán Mompó, Susana			
Lecturers	González Fernández, María África Magadán Mompó, Susana Valverde Pérez, Diana			
E-mail	smaga@uvigo.es			
Web				
General description	Materia de carácter teórico-práctico deseñada para desenvolver competencias e habilidades que permitan ao estudiantado entender as bases dos procesos bioquímicos e Inmunolóxicos con maior impacto na saúde humana. Trataranse aspectos relativos á aplicación das determinacións bioquímicas e inmunolóxicas para o diagnóstico e seguimento de enfermidades humanas			

Resultados de Formación e Aprendizaxe	
Code	
A2	Que os estudantes saiban aplicar os seus coñecementos ó seu traballo ou vocación dunha forma profesional e posúan as competencias que adoitan demostrarse por medio da elaboración e defensa de argumentos e a resolución de problemas dentro da súa área de estudo.
A3	Que os estudantes teñan a capacidade de reunir e interpretar datos relevantes (normalmente dentro da súa área de estudo) para emitir xuízos que inclúan unha reflexión sobre temas relevantes de índole social, científica ou ética.
B2	Capacidade de lectura e análise de documentos científicos e de interpretar datos e informacións, extraendo o esencial do accesorio ou secundario, e de fundamentar debidamente as pertinentes conclusións.
B3	Adquirir coñecementos xerais das materias básicas da bioloxía, tanto a nivel teórico como experimental, sen descartar unha maior especialización en materias que se orientan a un ámbito profesional concreto.
B4	Capacidade para manexar ferramentas experimentais, incluíndo a instrumentación científica e informática, que apoién a busca de solucións a problemas relacionados co coñecemento básico da bioloxía e con aqueles propios dun contexto laboral.
C3	Identificar, analizar e caracterizar mostras de orixe biolóxica, incluídas as de orixe humana, e as súas posibles anomalías
C4	Isolar, analizar e identificar biomoléculas, virus, células, tecidos e órganos
C6	Avaliar e interpretar actividades metabólicas
C10	Analizar e interpretar as adaptacións dos seres vivos ao medio
C15	Describir, analizar, avaliar e planificar o medio físico. Interpretar a paisaxe
C17	Identificar e obter produtos naturais de orixe biolóxica
D3	Desenvolver habilidades de comunicación oral e escrita
D4	Adquirir coñecementos de lingua estranxeira relativos ao ámbito de estudo

Resultados previstos na materia	
Expected results from this subject	Training and Learning Results
Entender os fundamentos metodolóxicos e interpretación dos resultados das probas analíticas e inmunolóxicas para a emisión dun diagnóstico fiable.	A2 B2 C3 D3 A3 B3 C4 D4 B4 C6 C10 C15 C17
Identificar os distintos tipos de mostras clínicas humanas, os métodos de procesado e as probas analíticas que se empregan nos laboratorios de Bioquímica e Inmunoloxía clínica.	A2 B3 C3 D3 C4 C6 C15 C17
Coñecer os fundamentos e as aplicacións da bioquímica clínica para o diagnóstico de enfermidades, analizando os factores que poden afectar o resultado dunha analítica.	A2 B2 C3 D3 A3 B3 C6 D4 B4 C10 C15 C17

Explicar os mecanismos de regulación da resposta inmunitaria humana, as súas alteracións en procesos patolóxicos e estratexias inmunoterapéuticas.	A2 A3	B2 B3 B4	C6 C10 C15 C17	
Comprender a proxección social das probas analíticas e a súa repercusión no exercicio profesional.	A2 A3	B2	C10 C17	D3 D4

Contidos

Topic

Tema 1. Fases do diagnóstico. Fase preanalítica. Obtención de espécimens. POCT.

Tema 2. Control de calidade no laboratorio clínico. Selección e validación de métodos.

Tema 3. Valor diagnóstico das probas clínicas. Valores de referencia e interpretación dos resultados.

Tema 4. Elementos básicos de Bioquímica Clínica. Valor semiolóxico da determinación de magnitudes bioquímicas: analitos e metabolismo.

Tema 5. Diagnóstico clínico de alteracións de órganos e sistemas. Paneis de probas diagnósticas e a súa interpretación.

Tema 6. Metabolismo da glicosa. Metabolismo óseo. Metabolismo dos lípidos.

Tema 7. Función hepática. Función do rin. Enfermidade cardíaca.

Tema 8. Introducción á Inmunoloxía clínica. Técnicas máis empregadas na Inmunoloxía clínica/Anticorpos monoclonais.

Tema 9. Inmunodeficiencias. Técnicas de diagnóstico e estudo da evolución de inmunodeficiencias primarias e secundarias.

Tema 10. Enfermidades autoinflamatorias e autoinmunitarias. Tipos, técnicas de diagnóstico, terapias e estudo da evolución.

Tema 11. Vacinación-resposta á vacina- Diagnóstico de infección. Técnicas para avaliar resposta humoral (Acs) e celular.

Tema 12. Transplantes e rexeitamento inmunitario. Ensaos para avaliar biocompatibilidade e evolución do Transplante.

Tema 13. Cancro. Inmunoensaos para o estudo de tumores do sangue e sólidos. Enfermidade mínima residual. Inmunoterapias fronte ao cancro.

Tema 14. Fertilidade. Aspectos inmunolóxicos que afectan ó embarazo. Ensaos para avaliar problemas de fertilidade de causa inmunolóxica.

Tema 15. Hipersensibilidade. Tipos de hipersensibilidade e pseudoalerxia. Técnicas de diagnóstico e estudo de evolución da enfermidade.

Planificación

	Class hours	Hours outside the classroom	Total hours
Lección maxistral	18	36	54
Prácticas de laboratorio	28	26	54
Seminario	2	8	10
Exame de preguntas obxectivas	1	6	7
Práctica de laboratorio	4	8	12
Estudo de casos	2	4	6
Exame de preguntas obxectivas	1	6	7

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Metodoloxía docente

	Description
Lección maxistral	Exposición por parte do docente dos fundamentos e principios básicos da bioquímica e da inmunoloxía clínicas. Preténdese que o alumno adquira coñecementos básicos relacionados co control da calidade, probas diagnósticas, metodoloxías e interpretación de resultados. Como apoio ás explicacións teóricas, proporcionarase aos alumnos o material docente apropiado a través da plataforma Moovi do Campus Virtual.
Prácticas de laboratorio	O traballo no laboratorio está dirixido a conseguir competencias na realización das probas analíticas e interpretación dos resultados, co obxectivo de formar ao alumno nas actividades levadas a cabo nos laboratorios de Bioquímica ou Inmunoloxía clínica. Aos alumnos solicitaráselle a entrega dun informe de prácticas e/ou a solución de cuestións e/ou exercicios. Como apoio ás prácticas de laboratorio, proporcionarase aos alumnos o material docente apropiado a través da plataforma *Moovi do Campus Virtual.
Seminario	Os seminarios realizaranse mediante estudo de casos. Con eles preténdese que o estudantado desenvolva a súa capacidade para integrar e interpretar as análises clínicas no seu conxunto, resolver problemas, contrastar datos, reflexionar, completar coñecementos e realizar diagnóstico en base aos datos dispoñibles, adestrándose así nas bases do diagnóstico clínico. O traballo de estudo de casos realizarase por grupos reducidos de alumnos e será exposto nas datas sinaladas no calendario de actividades. Ao comezo de curso informarase o alumnado do procedemento a seguir.

Atención personalizada

Methodologies	Description
Lección maxistral	As sesións expositivas serán participativas. A atención personalizada será realizada polos docentes responsables de cada tema nas correspondentes horas semanais de tutoría.
Prácticas de laboratorio	Os/As docentes responsables proporcionarán atención individualizada a cada alumno durante a realización das prácticas de laboratorio e darán o soporte necesario para a comprensión dos obxectivos, metodoloxía, técnicas concretas a utilizar e interpretación de resultados.
Seminario	Os/As estudantes serán distribuídos en pequenos grupos que resolverán estudo de casos relacionados coa análise e diagnóstico clínico. A resolución dos casos, os argumentos e os criterios utilizados deberán ser expostos e defendidos nunha presentación oral na que intervirán todos os membros do grupo. O traballo autónomo do/da alumno/a será supervisado, e resoltas as dúbidas polos profesores responsables. Todas as consultas e orientacións serán nas horas de tutorías de cada docente.

Avaliación

	Description	Qualification	Training and Learning Results			
Exame de preguntas obxectivas	Realizarase unha proba escrita: 1) Temas 1 ao 7. Suporá o 25% da nota final. Nas probas serán avaliados os contidos fundamentais da materia (clases maxistráis e prácticas) a través de preguntas obxectivas (tipo test e resposta curta). PARA SUPERAR A MATERIA se esixe: a) un mínimo de 4 puntos (sobre 10) na proba escrita e b) obter unha nota media mínima de 5, calculada a partir da nota obtida na proba (Temas 1 ao 7) e proba (Temas 8 ao 15)	25	A2 A3	B2 B3	C3 C4 C6 C10 C15 C17	D3
Práctica de laboratorio	As capacidades e destrezas adquiridas durante as prácticas de laboratorio serán AVALIADAS DE FORMA CONTINUA. A metodoloxía de avaliación e ponderación na nota final inclúe: 1- Implicación do alumno no desenvolvemento das prácticas. Suporá un 10% da cualificación final. 2- Entrega de informes de prácticas de laboratorio: de Bioquímica (BQ) e Inmunoloxía (IN) clínicas. Os informes serán ealizados por cada un dos subgrupos de alumnos organizado en cada grupo de prácticas. A nota media (BQ +IN /2) obtida nos informes suporá o 15% da nota final. 3- Resolución de problemas / exercicios /cuestións nas prácticas de laboratorio, cuxos resultados serán entregados na mesma sesión práctica e/ou xunto co informe de prácticas. A nota media (BQ +IN /2) obtida suporá o 15% da nota final.	40	A2 A3	B2 B3 B4	C3 C4 C6 C10 C15	D3 D4
Estudo de casos	Resolución e presentación de casos clínicos, exposición e discusión do caso asignado. Suporá un 10% da cualificación final.	10	A2 A3	B2 B3 B4	C3 C6 C10 C15 C17	D4

Exame de preguntas obxectivas	Realizarase unha proba escrita: 1) Temas 8 ao 15. Suporá o 25% da nota final. Nas probas serán avaliados os contidos fundamentais da materia (clases maxistráis e prácticas) a través de preguntas obxectivas (tipo test e resposta curta). PARA SUPERAR A MATERIA se esixe: a) un mínimo de 4 puntos (sobre 10) na proba escrita e b) obter unha nota media mínima de 5, calculada a partir da nota obtida na proba (Temas 1 ao 7) e proba (Temas 8 ao 15)	25	A2 A3	B2 B3	C3 C4 C6 C10 C15 C17	D3 D4
-------------------------------	--	----	----------	----------	-------------------------------------	----------

Other comments on the Evaluation

Importante: Independentemente que o/a alumno/a escolla AVALIACIÓN CONTINUA OU GLOBAL a asistencia a todas as PRÁCTICAS DE LABORATORIO é OBRIGATORIA para APROBAR a materia (salvo as ausencias debidamente xustificadas).

Avaliación continua:

1) Dúas probas parciais: cada unha suporá o 25% da nota. Proba 1 (Temas do 1 ao 7) e proba 2 (Temas do 8 ao 15). PARA SUPERAR A MATERIA se esixe: a) un mínimo de 4 puntos (sobre 10) en cada proba e b) obter unha nota media mínima de 5, calculada a partir da nota obtida nos dous parciais.

2) Prácticas de laboratorio: Implicación do alumno (10% da nota final) + informes prácticas BQ e IN (15% da nota final) + resolución problemas/cuestións de BQ e IN clínica (15% da nota final).

3) Seminario /estudo de casos: 10% da nota final.

Para superar a materia a suma: nota media dos parciais + nota prácticas + nota seminario ten que ser igual ou superior a 5.

As actividades (proba parcial, prácticas e seminarios) superadas na primeira oportunidade dun curso se conservan para a segunda oportunidade. Na segunda oportunidade dun curso non se poden recuperar prácticas e seminarios, só se poden realizar os exames parciais non superados na primeira oportunidade.

Aos alumnos/as repetidores/as conservaráselles a nota das prácticas e os seminarios. Terán dereito a repetir as devanditas actividades sempre e cando renuncien por escrito á cualificación obtida anteriormente (documento asinado e enviado ao coordinador/a). A renuncia ten que ser feita antes de que comencen as prácticas.

Avaliación global:

O/a alumno/a que escolla avaliación global terá que superar unha proba final integradora na que se avaliará dos contidos das aulas maxistráis, prácticas de laboratorio e seminarios/estudos de caso. A proba consistirá en preguntas tipo test, preguntas curtas e resolución de problemas/caso clínico.

Para superar a materia a nota da proba global terá que ser igual ou superior a 5. De non superarse a proba final, a calificación do/a alumno/a SÓ será a obtida na proba final integradora sobre 10 puntos.

Na segunda oportunidade do curso, o/a alumno/a suspenso/a terá que ser novamente avaliado de todas as actividades mediante unha proba global.

Se non se supera a materia en ningunha das oportunidades do curso. O/a alumno/a non terá que facer as prácticas, pero si será avaliado/a novamente de todos os contidos (aulas expositivas, prácticas e seminarios), xa sexa mediante avaliación continua ou global.

Información xeral

O calendario académico pódese consultar no seguinte enlace:

<http://bioloxia.uvigo.es/gl/docencia/horarios>

O calendario de exames pódese consultar no seguinte enlace:

<http://bioloxia.uvigo.es/gl/docencia/exames>

Bibliografía. Fontes de información

Basic Bibliography

Marshall, William J, **Bioquímica Clínica**, 7ª edición, Elsevier, 2013

□ Michael Julian Murphy, Rajeev Srivastava, Kevin Deans., **Bioquímica Clínica. Texto y Atlas en color.**, 6ª edición, Elsevier, 2019

González Hernández, Álvaro, **Principios de bioquímica clínica y patología molecular**, 3ª edición, Elsevier, 2019

Lieberman M.A, **Bioquímica médica básica: un enfoque clínico**, 5ª edición, Wolters Kluwer,, 2018

Baynes, John W, **Bioquímica médica**, 5ª edición, Elsevier, 2019

Richard A. McPherson, Matthew R. Pincus, **Henry's clinical diagnosis and management by laboratory methods**, 24ª edición, Elsevier, 2022

Robert R Rich, **Inmunología clínica. Principios y práctica**, 5ª edición, Elsevier, 2019

Barbara Detrick, **Manual of molecular and clinical laboratory immunology**, 8ª edición, ASM Press, 2016

Robert R Rich et al, **Técnicas básicas de laboratorio en inmunología clínica**, 1ª edición, Elsevier, 2020

Bretscher Peter et al, **The foundations of Immunology and their Pertinence to Medicine**, 1ª edición, Friesen Press, 2016

Africa González Fernández et al, **Inmunogenética**, 1ª edición, Síntesis, 2018

toyo JR,et al, **Inmunotecnología y sus aplicaciones**, 1ª edición, Universidad de Oviedo, 2018

Regueiro, JR, et al,, **Inmunología: biología y patología del sistema inmunitario**, 5ª edición, Panamericana, 2021

Male, D; Peebles, RS., et al, **Inmunología**, 9ª edición, Elsevier, 2021

Abbas et al, **Inmunología celular y molecular**, 9ª edición, Elsevier, 2018

Judith A. Owen, et al, **Kubi Immunology**, 7ª edición, McGraw/Hill, 2014

Complementary Bibliography

<https://www.inmunologia.org/revista/home.php>,

<https://www.sciencedirect.com/journal/clinical-immunology>,

Recomendacións

Subjects that are recommended to be taken simultaneously

Biología celular e fisiología integrativas: Implicacións na saúde/V02G031V01407

Xenética humana e patoloxía molecular/V02G031V01408

Microbioloxía e parasitoloxía sanitarias/V02G031V01406

Subjects that it is recommended to have taken before

Bioquímica I/V02G031V01201

Bioquímica II/V02G031V01206

Inmunoloxía e parasitoloxía/V02G031V01305

Técnicas en bioloxía celular e molecular/V02G031V01310

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 Velando Rodríguez, Alberto Luís			
E-mail	colabarria@uvigo.es			
Web				
General description	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. 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. School calendar #http://bioloxia.uvigo.es/*gl/*docencia/schedules			

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. Interpreting 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 writing 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	Acquisition of an ethical agreement with the society and the profession
D12	Respectful behaviour to diversity and multiculturalism
D13	Sensitivity for environmental issues
D14	Acquisition of abilities in the interpersonal relationships
D16	Acceptance of a quality 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 C12 C13 C15 C29 C31 C32	D1 D2 D3 D4 D5 D6 D7 D9 D10 D12 D16 D17

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
				D17
Apply knowledges of evaluation of environmental impact to identify, handle and #analyze **especímenes and samples of biological origin	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
				D17
				D18
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	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
---------------	-------------

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
					C15 C19 C29 C32	D16 D17
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
					C14 C15 C19 C29 C31 C32	D5 D6 D7 D8 D9 D10
						D11 D12 D13 D16 D17
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
- Gómez Orea, D., **Evaluación de impacto ambiental: un instrumento preventivo para la gestión ambiental**, 2ª ed, Mundi-Prensa, 2003
- 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>,
International Association for Impact Assessment (IAIA): <http://www.iaia.org>,
Ministerio de Medio Ambiente: <http://www.mma.es>,
- 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
- Environmental Impact Assessment Review, <http://www.sciencedirect.com/science/journal/01959255>,
- Cantó, S., Riera, P., Borrego, A., **La evaluación de impacto ambiental en España: coste y limitaciones**, 371, Economía Industrial, 2009
- 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
- Lozano Cutanda, B., **Ley 9/2018: análisis de las modificaciones de la Ley de Evaluación Ambiental**, 86, Actualidad Jurídica Ambiental, 2019
- 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
- Pardo, M., **Environmental impact assessment myth or reality? Lessons from Spain**, 17, Environmental Impact Assessment, 1997
- Torres, A., Palacín, C., Seoane, J., Alonso, J.C., **Assessing the effects of a highway on a threatened species using Before-During-After and Before-During-After-Control-Impact designs**, 144, Biological Conservation, 2011
- Newman, E.I., **Applied Ecology and Environmental Management**, 2ª ed., Wiley-Blackwell, 2000
- Partidário, M.R., **Guía de Mejores Prácticas para la Evaluación Ambiental Estratégica**, Agencia Portuguesa do Ambiente (APA) y Redes Energ, 2012
- Mata, C., Hervás, I., Herranz, J., Suárez, F., Malo, J.E., **Are motorway wildlife passages worth building? vertebrate use of road-crossing structures on a Spanish motorway**, 88, Journal of Environmental Management, 2008
- Rabin, L.A., Coss, R.G., Owings, D.H., **The effects of wind turbines on antipredator behavior in California ground squirrels**, 131, Biological Conservation, 2006
- 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

IDENTIFYING DATA				
Biodiversidade: Xestión e conservación				
Subject	Biodiversidade: Xestión e conservación			
Code	V02G030V01905			
Study programme	Grao en Bioloxía			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4	1c
Teaching language	Castelán Galego			
Department				
Coordinator	Garrido González, Josefa			
Lecturers	Caballero Rúa, Armando Garrido González, Josefa Gomez Brandon, Maria Navarro Echeverría, Luis			
E-mail	jgarrido@uvigo.es			
Web				
General description	Estudo dos conceptos básicos que implican coñecer a xestión e conservación da biodiversidade			
	http://bioloxia.uvigo.es/gl/docencia/horarios			

Resultados de Formación e Aprendizaxe	
Code	
A1	Que os estudantes demostren posuír e comprender coñecementos nunha área de estudo que parte da base da educación secundaria xeral e adoita atoparse a un nivel que, malia se apoiar en libros de texto avanzados, inclúe tamén algúns aspectos que implican coñecementos procedentes da vangarda do seu campo de estudo.
A2	Que os estudantes saiban aplicar os seus coñecementos ó seu traballo ou vocación dunha forma profesional e posúan as competencias que adoitan demostrarse por medio da elaboración e defensa de argumentos e a resolución de problemas dentro da súa área de estudo.
A3	Que os estudantes teñan a capacidade de reunir e interpretar datos relevantes (normalmente dentro da súa área de estudo) para emitir xuízos que inclúan unha reflexión sobre temas relevantes de índole social, científica ou ética.
A4	Que os estudantes poidan transmitir información, ideas, problemas e solución a un público tanto especializado como non especializado.
A5	Que os estudantes desenvolvan aquelas habilidades de aprendizaxe necesarias para emprender estudos posteriores cun alto grao de autonomía.
B2	Capacidade de lectura e análise de documentos científicos e de interpretar datos e informacións, extraendo o esencial do accesorio ou secundario, e de fundamentar debidamente as pertinentes conclusións.
B3	Adquirir coñecementos xerais das materias básicas da bioloxía, tanto a nivel teórico como experimental, sen descartar unha maior especialización en materias que se orientan a un ámbito profesional concreto.
B4	Capacidade para manexar ferramentas experimentais, incluíndo a instrumentación científica e informática, que apoién a busca de solucións a problemas relacionados co coñecemento básico da bioloxía e con aqueles propios dun contexto laboral.
B5	Coñecer os niveis de organización dos seres vivos tanto dende un punto de vista estrutural (molecular, celular, orgánico) como funcional, observando as súas relacións co medio e con outros organismos, así como as súas manifestacións ante situacións de alteración ambiental.
B7	Saber recompilar información sobre temas de interese de ámbito biolóxico, analizala e emitir xuízos críticos e razoados sobre estes, incluíndo cando sexa precisa a reflexión sobre aspectos sociais e/ou éticos relacionados coa temática.
B10	Desenvolver as capacidades analíticas e de abstracción, a intuición e o pensamento lóxico e rigoroso a través do estudo da bioloxía e as súas aplicacións.
B11	Saber comunicar a todo tipo de audiencias (especializadas ou non) de xeito claro e preciso coñecementos, metodoloxías, ideas, problemas e solucións relacionadas con distintos ámbitos da bioloxía.
B12	Capacidade para identificar as súas propias necesidades formativas no campo da bioloxía e en ámbitos laborais concretos, e de organizar a súa aprendizaxe cun alto grao de autonomía en calquera contexto.
C1	Obter, manexar, conservar, describir e identificar espécimes biolóxicos actuais e fósiles
C9	Analizar e interpretar o comportamento dos seres vivos
C10	Analizar e interpretar as adaptacións dos seres vivos ao medio
C11	Tomar mostras, caracterizar, xerir, conservar e restaurar poboacións, comunidades e ecosistemas
C12	Catalogar, cartografiar, avaliar, conservar, restaurar e xerir recursos naturais e biolóxicos
C15	Describir, analizar, avaliar e planificar o medio físico. Interpretar a paisaxe
C19	Identificar, xerir e comunicar riscos agroalimentarios e ambientais
C22	Identificar, caracterizar e utilizar bioindicadores
C23	Desenvolver, xerir e aplicar técnicas de control biolóxico
C25	Obter información, desenvolver experimentos e interpretar os resultados

C31	Coñecer e manexar instrumentación científico-técnica
C32	Capacidade para coñecer e manexar os conceptos e a terminoloxía propios ou específicos
C33	Capacidade para comprender a proxección social da bioloxía
D1	Desenvolver a capacidade de análise e síntese
D2	Adquirir a capacidade de organizar e planificar as tarefas e o tempo
D3	Desenvolver habilidades de comunicación oral e escrita
D4	Adquirir coñecementos de lingua estranxeira relativos ao ámbito de estudo
D5	Empregar recursos informáticos relativos ao ámbito de estudo
D6	Saber buscar e interpretar información procedente de fontes diversas
D7	Resolver problemas e tomar decisións de forma efectiva
D8	Desenvolver a capacidade de aprendizaxe autónoma
D9	Traballar en colaboración ou formando equipos de carácter interdisciplinar
D10	Desenvolver o razoamento crítico
D11	Adquirir un compromiso ético coa sociedade e a profesión
D12	Comportarse con respecto á diversidade e a multiculturalidade
D13	Sensibilización polos temas medioambientais
D14	Adquirir habilidades nas relacións interpersoais
D15	Desarrollar a creatividade, a iniciativa e o espírito emprendedor
D16	Asumir un compromiso coa calidade
D17	Desenvolver a capacidade de autocritica
D18	Desenvolver a capacidade de negociación

Resultados previstos na materia

Expected results from this subject	Training and Learning Results			
Coñecer as diferentes formas de expresión, avaliación e significado da diversidade biolóxica de diferentes niveis de organización (poboacións, ecosistemas, paisaxe)	A1	B2	C1	D1
	A2	B3	C15	D2
	A3	B5	C19	D4
	A4	B7	C32	D6
	A5	B10		D8
		B12		D10
				D14
				D15
				D16
				D17
Aprender a diferenciar os instrumentos técnicos de xestión e conservación de poboacións, especies e comunidades biolóxicas	A1	B2	C1	D1
	A2	B4	C22	D5
	A3	B5	C23	D6
	A4	B7	C25	D7
	A5	B10	C31	D9
		B12	C32	D10
				D13
Coñecer os factores de control e estratexias de conservación e uso da diversidade de especies dos ecosistemas	A1	B2	C1	D1
	A2	B4	C10	D6
	A3	B5	C12	D7
	A4	B7	C23	D8
	A5	B10	C25	D9
		B12	C31	D10
			C32	D12
Comprender os efectos de especies invasoras e pragas sobre a conservación da biodiversidade e as técnicas de control biolóxico en ecosistemas naturais e explotados polo home	A1	B2	C1	D6
	A2	B4	C23	D7
	A3	B5	C25	D9
	A4	B10		D10
	A5			
Aplicar o coñecemento da biodiversidade para identificar, manexar e analizar espécimes e mostras de orixe biolóxica	A1	B2	C1	D1
	A2	B4	C11	D5
	A3	B7	C12	D6
	A4		C23	D7
	A5		C25	
			C31	
			C32	
Analizar e interpretar o comportamento dos seres vivos e a súa adaptación ao medio	A1	B2	C9	D6
	A2	B4	C10	
	A3	B7	C25	
	A4			
	A5			

Aplicar coñecementos e técnicas propios da biodiversidade en diferentes procesos relacionados coa xestión do medio	A1	B2	C11	D1
	A2	B4	C12	D5
	A3	B5	C23	D6
	A4	B7	C25	D7
	A5		C31	D9
			C32	D10
				D18
Obter información, desenvolver experimentos e interpretar resultados	A1	B2	C11	D1
	A2	B4	C12	D3
	A3	B7	C23	D5
	A4	B10	C25	D6
	A5		C31	D7
				D8
				D9
				D10
				D12
				D13
				D18
Comprender a proxección social da biodiversidade e a súa repercusión no exercicio profesional	A1	B11	C33	D11
	A2	B12		D12
	A3			D13
	A4			D14
	A5			D15
				D16
				D17
Coñecer e manexar os conceptos, terminoloxía e instrumentación científico-técnica relativos á biodiversidade	A1	B4	C1	D1
	A2	B11	C32	D5
	A3	B12		D6
	A4			D8
	A5			D10

Contidos

Topic	
FUNDAMENTOS CONCEPTUAIS DA BIODIVERSIDADE	Biodiversidade: Conceptos básicos. Indicadores e medidas da biodiversidade. Biodiversidade e Ecosistemas
CAUSAS E CONSECUENCIAS DA PERDA DE BIODIVERSIDADE	Patróns de extinción e ameazas á Biodiversidade. Impacto biolóxico do cambio global.
XESTIÓN E CONSERVACIÓN DA DIVERSIDAD BIOLÓXICA	Conservación e seguimento de poboacións e especies. Xenética da Conservación. Ferramentas para o inventario de flora e fauna. Seguimento de poboacións de plantas e animais. Plans de conservación de especies. Biodiversidade e Sociedade.

Planificación

	Class hours	Hours outside the classroom	Total hours
Prácticas con apoio das TIC	4	8	12
Saídas de estudo	20	20	40
Traballo tutelado	2	24	26
Lección maxistral	23	46	69

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Metodoloxía docente

	Description
Prácticas con apoio das TIC	Analizaranse datos simulados e reais de genealogías e de marcadores moleculares e aplicaranse á xestión de programas de conservación ex-situ.
Saídas de estudo	Realizaranse saídas na contorna da Facultade, que se complementarán con identificacións no laboratorio, de ser necesario. Tamén, realizarase unha saída longa a un espazo natural protexido.
Traballo tutelado	O alumno realizará un traballo tutelado que deberá expoñer no aula ao final do curso.
Lección maxistral	Exposición por parte do profesorado de cada un dos temas do programa, co apoio infográfico oportuno.

Atención personalizada

Methodologies	Description
---------------	-------------

Lección maxistral	A atención é en grupo e ten lugar na aula onde se realice a lección maxistral. Nesta actividade o docente ten como función orientar e guiar no proceso de aprendizaxe ao alumnado, tentando en todo momento que comprenda cada un dos temas do programa, co apoio informático oportuno.
Prácticas con apoio das TIC	A atención pode ser individual ou en grupos reducidos e ten lugar na aula de informática. Nesta actividade o docente ten como función orientar e guiar o proceso de aprendizaxe do alumnado e axudalo a realizar con éxito o correspondente traballo.
Saídas de estudo	A atención é en grupos reducidos e ten lugar na contorna da Facultade cando se realicen as saídas ao mesmo ou no laboratorio cando se estea traballando coas mostras recadadas nas saídas de campo. Na saída longa a un espazo natural protexido, o docente ten como función orientar e guiar ao alumno, para que adquira con éxito o proceso de aprendizaxe do medio natural que observará en todo momento.
Traballo tutelado	Tempo reservado por cada docente para atender e resolver as dúbidas do alumnado. A atención pode ser individual ou en grupos reducidos e ten lugar normalmente no gabinete do docente ou na aula se é preciso. Nestas actividades o docente ten como función orientar e guiar o proceso de aprendizaxe do alumnado e axudalo a realizar con éxito o correspondente traballo autónomo. O profesorado indica os primeiros días de clase o lugar, día e horas para esa atención personalizada.

Avaliación

	Description	Qualification Training and Learning Results
Prácticas con apoio das TIC	Avaliaranse as prácticas realizadas na Aula de Informática xunto coas prácticas de campo.	5
Saídas de estudo	Avaliaranse as saídas de campo e os traballos no laboratorio (o valor é do 15% para Zooloxía e 15% para Botánica).	35
Traballo tutelado	O traballo realizado polo alumno será avaliado, ben individualmente ou en grupo, en función do número de alumnos matriculados.	20
Lección maxistral	Realizarase un examen final que consistirá en preguntas sobre os distintos conceptos impartidos na lección magistral.	40

Other comments on the Evaluation

Propónse unha Avaliación Continua (EC) en función da asistencia a clase e da calidade dos resultados asociados ás tarefas propostas.

Avaliación global (EG): Aqueles alumnos que non poidan cumprir o método de avaliación continua (CE) descrito poderán acollerse a unha única avaliación global, entendendo como tal a que se realiza nun só acto académico, que poderá incluír tantas probas como necesario acreditar que o alumnado adquiriu todos os Resultados de Formación e Aprendizaxe descritos nesta Guía Docente.

O calendario de exames e horarios pódese consultar nas seguintes ligazóns:

<http://bioloxia.uvigo.es/gl/docencia/horarios>

<http://bioloxia.uvigo.es/gl/docencia/exames>

Bibliografía. Fontes de información

Basic Bibliography

Begon, M., Mortimer, M. & D. J. Thompson, **Population Ecology: a unified study of animals and plants**, 3a. edición, Blackwell Science, 1996

Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L. & Thomas, L., **Introduction to Distance Sampling: Estimating Abundance of Biological Populations**, Oxford University Press, 2001

Caughley, G., **Analysis of vertebrate populations**, John Wiley and Sons, 1977

Dobson, A. P., **Conservation and biodiversity**, Scientific American Library, 1996

Frankham, R., J. D. Ballou y D. A. Briscoe, **Introduction to Conservation Genetics**, Cambridge University Press, 2002

Hunter, M. L., Gibbs, J. P., **Fundamentals of conservation biology**, Wiley-Blackwell, 2007

Pullin, A. S., **Conservation biology**, Cambridge University Press, 2002

Sutherland, W. J., **The conservation handbook: research, management and policy**, John Wiley & Sons, 2000

van Dyke, F., **Conservation Biology: Foundations, Concepts, Applications**, 2nd ed, Springer Verlag, 2008

Complementary Bibliography

Beissinger, S. R. & McCullough, D. R., **Population Viability Analysis**, University of Chicago Press, 2002

Caswell, H., **Matrix Population Models – Construction, Analysis, and Interpretation**, Sinauer Associates, 1989

Caughley, G., Gunn, A, **Conservation biology in theory and practice**, Wiley-Blackwell, 1996

Ebert, T., **Plant and Animal populations. Methods in demography**, Academic Press, 1999

Gaston, KJ, y Spicer JL, **Biodiversity: an introduction**, Wiley-Blackwell, 2004

Gilpin, M.E. and Soulé, M.E, **Conservation biology: The Science of Scarcity and Diversity**, Sinauer Associates, 1986

Gosling M.L. & Sutherland, W.J, **Behaviour and conservation. Conservation Biology Series 2**, Cambridge University Press, 2000

Hanski, I.A. & M.E. Gilpin, **Metapopulation biology**, Academic Press, 1997

Primack, R. B., **A Primer of Conservation Biology**, 3rd ed., Sinauer Associates, 2004

Sinclair, A. R.E., Fryxell, J. M. Caughley, G, **Wildlife ecology, conservation, and management**, 2nd ed, Blackwell Science, 2006

Recomendacións

IDENTIFYING DATA				
Pollution				
Subject	Pollution			
Code	V02G030V01906			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	2nd
Teaching language	Spanish Galician			
Department				
Coordinator	Fernández Covelo, Emma			
Lecturers	Fernández Covelo, Emma Gomez Brandon, María González Rodríguez, Luis Mariño Callejo, María Fuencisla			
E-mail	emmaf@uvigo.es			
Web				
General description	Know of form updated the distinct sources and types of contaminants that affect to the half and to the biota Know the dynamics of the *contaminantes in the compartments of the ecosystem Know the processes of reuse of waste and biorremediación for recovery of environments contaminated http://bioloxia.uvigo.es/docs/docencia/horarios/hor_4grado_1sem1718.pdf			

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.
C3	Identifying, analysing and characterizing biological samples, including those of human origin, and possible anomalies.
C6	Assessing and interpreting metabolic activities.
C8	Assessing the functioning of physiological systems by the interpretation of parameters
C10	Analysing and assessing the adaptation of living beings to the environment.
C11	Sampling, characterizing, managing, preserving and restoring Populations, Communities and Ecosystems.
C13	Assessing environmental impact. Diagnosing and solving environmental issues
C14	Realising the analysis, control and purifying of waters.
C19	Identifying, addressing and communicating Agro-Food and environmental risks.
C21	Processing and interpreting bioessays and biological diagnoses.
C22	Identifying, describing and using bioindicators.
C23	Developing, managing and using biological control techniques.
C25	Gathering background information, develop experimental work and analysing data results

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 writing communication abilities
D6	Research and interpreting of information from different sources
D9	Ability to work in collaboration or creating groups with an interdisciplinary character
D10	Development of the critical thinking
D13	Sensitivity for environmental issues
D14	Adquisition of abilities in the interpersonal relationships

Expected results from this subject

Expected results from this subject	Training and Learning Results			
Know the main sources, the diverse types and, especially, the dynamics of the more important pollutants and its relation with the biology	A1	B2 B3	C8 C10	D13
Comprise the concept of environmental pollution and his effects on the organisms. It is important that understand the processes of treatments and biorremediation of the pollution	A1	B2 B3	C3 C6	D1 D13
Know the diverse types of waste, his treatments and his use in processes of recovery in environments degraded	A1	B2 B3	C11	D13
Obtain an introductory vision of environmental toxicology, agroalimentary and in living beings	A4	B2 B3	C8 C31	D13
Know and understand in that cases has to be applied the valid legislation and the rules that develop it	A2 A5	B2 B3 B7 B10	C21	D1 D3 D6
Apply knowledges and technical own of the pollution in different processes related with the management of the half	A3	B2 B5 B10	C11 C13 C14 C19 C21 C22	D2 D3 D9 D10 D14
Apply knowledges and relative technology to the pollution in appearances related with the production, exploitation, analysis and diagnostic of processes and biological resources	A3 A5	B2 B10	C11 C23	D2 D3 D9 D10 D14
Obtain information, develop experiments and interpret results	A4 A5	B2 B10 B11 B12	C25	D2 D6 D10
Comprise the social projection of the pollution and its repercussion in the professional exercise	A5	B11 B12	C33	D10 D13
Know and handle the concepts, terminology and scientific instrumentation-technical relative to the pollution	A5	B2 B4	C32 C33	D2

Contents

Topic	
1. INTRODUCCION To THE CONTAMINATION	- Definition. Basic concepts. Types and categories of contaminants. - Sources and roads of entrance to the environment and biota. - Dynamic of contaminants: distribution and flow. - Bioindicators, biomonitors. - Legislation and normative
2. BIODEGRADABLE WASTE	-Organic matter -Oil and derivative
3. ORGANIC POLLUTANTS	-PAHs, Hydrocarbons halogenados, PCBs
4. SOLID WASTE AND DISSIPATE	- Plastic and other solid waste - heat
4. INORGANIC POLLUTANTS	-Acidity -Elements potentially toxic

5. MICROBIAL POLLUTION

- Concept and sources of pollution of microbial origin
- Microorganisms indicators of pollution
- Dynamic of microbial pollution in atmosphere, floor and water
- residual Waters and treatment. Treatment anoxic of lick.
- Impact of the pollution in environment.
- Legislation and normative on microbiological pollution

6. TREATMENT OF WASTE And PROCESSES OF RECOVERY

- Biorremediation.
- Composting.
- Reuse of waste through the system am used to-plant
- Recovery of floors contaminated

7. BIOLOGICAL EFFECTS OF The CONTAMINANTS

- Exhibition of alive organisms the contaminants. Routes of entrance. Toxicocinética. Bioaccumulation, Biotransformation.
- Effects of the contaminants to physiological level.
- Molecular and cellular mechanisms of action of the contaminants.
- Essays of toxicity.
- Effects of the contaminants to populational level and of communities of organisms.
- Evolution of resistance.

Planning

	Class hours	Hours outside the classroom	Total hours
Laboratory practical	20	10	30
Seminars	8	8	16
Mentored work	1	63	64
Lecturing	20	10	30
Objective questions exam	2	2	4
Report of practices, practicum and external practices	1	2	3
Problem and/or exercise solving	1	2	3

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Laboratory practical	Effect of a contaminant in the soil: it will study the total content and the availability. Effects on germination, growth and other physiological parameters of plants. Effect in the reproduction of oligoquetos and integrity of the lysosomal membrane and microbiological analysis of the solution of the floor. Detection of microbiological indicators of pollution. The assistance to practices will be compulsory to be able to surpass the matter
Seminars	It will complement the theoretical part tackling appearances that in the remained clear what was necessary to complement. Resolution of doubts, etc. At the end of the explanation of each subject, will deliver to the students a questionnaire of questions referred to the same and that they will have to deliver in the term that was fixed conveniently. In the part of Microbiology, the students will cover a test in the classroom when finishing the explanation of each one of the ones of the subjects.
Mentored work	The students will have the help of the professors of the matter for the preparation of the work of practices
Lecturing	Theoretical development-practical, presentation of objectives and conceptual frame of each subject, presenting specific bibliography and examples related

Personalized assistance

Methodologies	Description
Lecturing	
Laboratory practical	
Seminars	

Assessment

Description	Qualification	Training and Learning Results
-------------	---------------	-------------------------------

Objective questions exam	Final control of the matter by means of a questionnaire of short answers and/or test. The evaluation of this control will suppose 30% of the total qualification of the matter. It is precise to reach a 5 to do average with the practical note.	30	A1 B2 A2 B5 A3 B7 A4 B10 A5 B11 B12	C10 D1 C13 D2 D3 D6 D9 D10 D13 D14
Report of practices, practicum and external practices	The integrated report of the practices of edaphology, zoology, vegetal physiology and microbiology will be realised in the format of scientific article according to the norms of the Environmental Pollution. At the beginning of course and in each one of the practices of the matter will realise indications of the requirements of them. It will be necessary to approve this part to surpass the matter	40	A1 B2 A3 B3 A4 B4 A5 B7 B11	C3 D1 C6 D2 C11 D14 C13 C14 C19 C21 C22 C23 C25 C31 C32
Problem and/or exercise solving	Evaluation of the participation of the student in the seminars, assistance to theoretical classes, etc. The professors will be able to request the delivery of questionnaires or test of each subject (a questionnaire, or test, of each one of the subjects that appear in the apartade of contents.).	30	A2 B2 A3 B3 A4 B5 B7 B10	C6 D1 C8 D2 C10 D3 C13 D6 C19 D10 C23 C32 C33

Other comments on the Evaluation

For the announcement of July, will conserve the parts approved, since it presupposes that the competitions, aptitudes and knowledges purchased do not lose .

http://bioloxia.uvigo.es/docs/docencia/examenes/exames_grado_2017-18.pdf

Sources of information

Basic Bibliography

Complementary Bibliography

- Capó Martí, M., **Principios de Ecotoxicología**, Tébar,
- Mason, C.F., **Biology of Freshwater Pollution**, Longman, 3ª ed.,
- Clark, R.B., **Marine Pollution**, Oxford University, 5ª ed.,
- Walker, C.H., Hopkin, S.P., Sibly, R.M., Peakall, D.B., **Principles of Toxicology**, Taylor & Francis, 3ª ed.,
- Seoáñez Calvo, M., **Tratado de la Contaminación atmosférica**, Mundi Prensa,
- Hurst, C.J., Knudsen, G.R., McInern, M.J.ey, L.D. Stetzenbach, M.V. Walter (eds.), **Manual of Environmental Microbiology, 3ª ed.**, American Society for Microbiology,
- Rice, E.W., Baird, R.B., Eaton, A.D., Clesceri L.S. (eds), **Standard Methods for the Examination of Water and Wastewater. 23 th.**, A.P.H.A., A.W.W.A. and W.E.F. Washington.,
- Lagadic, L., Caquet, T., Amiard, J-C, Ramade, F., **Use of biomarkers for Environmental Quality Assessment**, Balkema,
- DeCaprio, A.P. (ed.), **Toxicologic Biomarkers**, Ed. Taylor & Francis,
- Mirshal, I., **Soil Pollution: Origin, Monitoring & Remediation.**, Springer Verlag,
- Sparks, D.L., **Environmental Soil Chemistry**, Academic Press,
- Tan, K., **Environmental Soil Science**, Marcel Dekker. New York,
- McCutcheon S.C. , Schnoor J.L., **Phytoremediation: Transformation and Control of Contaminants.**, Wiley and Sons, Inc.,
- Singh, A., Ward, O.P., **Applied Bioremediation and Phytoremediation.**, Springer-Verlag,
- Benlloch, M., Sancho, E., Tena, M. (eds.), **Fitorremediación de suelos contaminados del área de Aznalcóllar**, Universidad de Córdoba,
- Schmidt, T.M., Schaechter, M., **Topics in Ecological and Environmental Microbiology**, Academic Press,
- Bertrand, J.C., P. Caumette, P. Lebaron, R. Matheron, P. Normand, T. Sime-Ngando, **Environmental Microbiology: Fundamentals and Applications: Microbial Ecology.**, Springer.,
- Pepper, I.L., C.P. Gerba, T.J. Gentry., **Environmental Microbiology. 3º ed.**, Academic Press,
- H.B. Bradl, **Heavy Metals in the Environment: Origin, Interaction and Remediation**, Elsevier,
- Alina Kabata Pendias, **Trace Elements in Soils and Plants**, CRC Press,
- Yates, M.V., J.M., C.H. Nakatu, R.V. Miller., **Manual of Environmental Microbiology. 4ª ed.**, ASM Press.,
- Barton, L.L., McLean, R.JC., **Environmental Microbiology and Microbial Ecology.**, Wiley-Blackwel,

Beiras, R., **Marine Pollution: sources, fate and effects of pollutants in coastal ecosystems.**, Ed. Elsevier. UK., 2018

Lipp, W.C., E. B. Braun-Howland, T.E. Baxter (eds)., **Standard Methods for the Examination of Water and Wastewater. 24 th., A.P.H.A., A.W.W.A. and W.E.F. Washington.**, 2023

Recommendations

IDENTIFYING DATA				
Producción animal				
Subject	Producción animal			
Code	V02G030V01907			
Study programme	Grao en Bioloxía			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4	1c
Teaching language	Castelán Galego			
Department	Bioloxía funcional e ciencias da saúde Bioquímica, xenética e inmunoloxía			
Coordinator	Soengas Fernández, José Luis			
Lecturers	García Estévez, José Manuel Iglesias Blanco, Raúl Rolán Álvarez, Emilio Soengas Fernández, José Luis			
E-mail	jsoengas@uvigo.es			
Web				
General description	A materia Producción animal aborda as características básicas da devandita rama da ciencia, que se ocupa do estudo de como obter máximo rendemento, administrando os recursos adecuadamente baixo criterios de sustentabilidade para o mellor aproveitamento dos animais domésticos e silvestres que son útiles ao home para producir alimentos ou derivados (carne, ovos, leite, pel, etc) ou para cubrir outras necesidades (animais de experimentación, anticorpos, etc). O calendario académico se pode consultar en: http://bioloxia.uvigo.es/gl/docencia/horarios			

Resultados de Formación e Aprendizaxe

Code	
A1	Que os estudantes demostren posuír e comprender coñecementos nunha área de estudo que parte da base da educación secundaria xeral e adoita atoparse a un nivel que, malia se apoiar en libros de texto avanzados, inclúe tamén algúns aspectos que implican coñecementos procedentes da vangarda do seu campo de estudo.
A2	Que os estudantes saiban aplicar os seus coñecementos ó seu traballo ou vocación dunha forma profesional e posúan as competencias que adoitan demostrarse por medio da elaboración e defensa de argumentos e a resolución de problemas dentro da súa área de estudo.
A3	Que os estudantes teñan a capacidade de reunir e interpretar datos relevantes (normalmente dentro da súa área de estudo) para emitir xuízos que inclúan unha reflexión sobre temas relevantes de índole social, científica ou ética.
A4	Que os estudantes poidan transmitir información, ideas, problemas e solución a un público tanto especializado como non especializado.
A5	Que os estudantes desenvolvan aquelas habilidades de aprendizaxe necesarias para emprender estudos posteriores cun alto grao de autonomía.
B2	Capacidade de lectura e análise de documentos científicos e de interpretar datos e informacións, extraendo o esencial do accesorio ou secundario, e de fundamentar debidamente as pertinentes conclusións.
B3	Adquirir coñecementos xerais das materias básicas da bioloxía, tanto a nivel teórico como experimental, sen descartar unha maior especialización en materias que se orientan a un ámbito profesional concreto.
B4	Capacidade para manexar ferramentas experimentais, incluíndo a instrumentación científica e informática, que apoién a busca de solucións a problemas relacionados co coñecemento básico da bioloxía e con aqueles propios dun contexto laboral.
B7	Saber recompilar información sobre temas de interese de ámbito biolóxico, analizala e emitir xuízos críticos e razoados sobre estes, incluíndo cando sexa precisa a reflexión sobre aspectos sociais e/ou éticos relacionados coa temática.
B10	Desenvolver as capacidades analíticas e de abstracción, a intuición e o pensamento lóxico e rigoroso a través do estudo da bioloxía e as súas aplicacións.
B11	Saber comunicar a todo tipo de audiencias (especializadas ou non) de xeito claro e preciso coñecementos, metodoloxías, ideas, problemas e solucións relacionadas con distintos ámbitos da bioloxía.
B12	Capacidade para identificar as súas propias necesidades formativas no campo da bioloxía e en ámbitos laborais concretos, e de organizar a súa aprendizaxe cun alto grao de autonomía en calquera contexto.
C3	Identificar, analizar e caracterizar mostras de orixe biolóxica, incluídas as de orixe humana, e as súas posibles anomalías
C4	Isolar, analizar e identificar biomoléculas, virus, células, tecidos e órganos
C5	Cultivar microorganismos, células, tecidos e órganos
C7	Manipular e analizar o material xenético e levar a cabo asesoramento xenético
C10	Analizar e interpretar as adaptacións dos seres vivos ao medio
C16	Cultivar, producir, transformar, mellorar e explotar recursos biolóxicos
C17	Identificar e obter produtos naturais de orixe biolóxica
C18	Producir, transformar, controlar e conservar produtos agroalimentarios
C19	Identificar, xerir e comunicar riscos agroalimentarios e ambientais
C20	Deseñar, aplicar e supervisar procesos biotecnolóxicos

C21	Realizar e interpretar bioensaos e diagnósticos biolóxicos
C23	Desenvolver, xerir e aplicar técnicas de control biolóxico
C24	Deseñar modelos de procesos biolóxicos
C25	Obter información, desenvolver experimentos e interpretar os resultados
C31	Coñecer e manexar instrumentación científico-técnica
C32	Capacidade para coñecer e manexar os conceptos e a terminoloxía propios ou específicos
C33	Capacidade para comprender a proxección social da bioloxía
D1	Desenvolver a capacidade de análise e síntese
D2	Adquirir a capacidade de organizar e planificar as tarefas e o tempo
D3	Desenvolver habilidades de comunicación oral e escrita
D4	Adquirir coñecementos de lingua estranxeira relativos ao ámbito de estudo
D5	Empregar recursos informáticos relativos ao ámbito de estudo
D6	Saber buscar e interpretar información procedente de fontes diversas
D7	Resolver problemas e tomar decisións de forma efectiva
D8	Desenvolver a capacidade de aprendizaxe autónoma
D9	Traballar en colaboración ou formando equipos de carácter interdisciplinar
D10	Desenvolver o razoamento crítico
D11	Adquirir un compromiso ético coa sociedade e a profesión
D12	Comportarse con respecto á diversidade e a multiculturalidade
D13	Sensibilización polos temas medioambientais
D14	Adquirir habilidades nas relacións interpersoais
D15	Desarrollar a creatividade, a iniciativa e o espírito emprendedor
D16	Asumir un compromiso coa calidade
D17	Desenvolver a capacidade de autocrítica
D18	Desenvolver a capacidade de negociación

Resultados previstos na materia

Expected results from this subject	Training and Learning Results			
Comprender as técnicas de reprodución e mellora en produción animal	A1	B2	C3	D1
	A2	B3	C4	D2
	A3	B4	C5	D3
	A4	B7	C7	D4
	A5	B10	C10	D5
		B11	C16	D6
	B12	C17	D7	
			C18	D8
			C19	D9
			C21	D10
			C23	D11
			C24	D12
			C25	D13
			C31	D14
			C32	D16
			C33	D17
				D18
Comprender a nutrición e alimentación animal	A1	B2	C3	D1
	A2	B3	C4	D2
	A3	B4	C5	D3
	A4	B7	C7	D4
	A5	B10	C10	D5
		B11	C16	D6
	B12	C17	D7	
			C18	D8
			C19	D9
			C20	D10
			C21	D11
			C23	D12
			C24	D13
			C25	D14
			C31	D16
			C32	D17
			C33	D18

Coñecer a sanidade, hixiene e benestar animal

A1	B2	C3	D1
A2	B3	C4	D2
A3	B4	C5	D3
A4	B7	C7	D4
A5	B10	C10	D5
	B11	C16	D6
	B12	C17	D7
		C18	D8
		C19	D9
		C20	D10
		C21	D11
		C23	D12
		C24	D13
		C25	D14
		C31	D16
		C32	D17
		C33	D18

Coñecer a lexislación e normativas da produción animal

A1	B7	C7	D1
A2	B10	C10	D2
A3	B11	C16	D3
	B12	C17	D4
		C18	D5
		C19	D6
		C24	D7
		C25	D8
		C31	D9
		C32	D10
		C33	D11
			D12
			D13
			D14
			D16
			D17
			D18

Aplicar o coñecemento de produción animal para illar, identificar, manexar e analizar espécimes e mostras de orixe biolóxica, así como para caracterizar os seus constituíntes celulares e moleculares

A1	B2	C3	D2
A2	B3	C4	D4
A3	B4	C5	D5
A4	B7	C7	D6
A5	B10	C17	D7
	B11	C19	D9
	B12	C21	
		C31	
		C32	

Analizar e interpretar as adaptacións dos seres vivos ao medio

A1	B2	C10	D1
A2	B3	C19	D4
A3	B4	C23	D6
A4	B7	C24	D7
A5	B10	C32	D9
	B11		D13
	B12		

Aplicar coñecementos e tecnoloxía relativos a produción animal en aspectos relacionados coa produción, explotación, análise e diagnóstico de procesos e recursos biolóxicos

A1	B2	C5	D2
A2	B3	C16	D3
A3	B4	C18	D6
A4	B7	C19	D7
A5	B10	C20	D8
	B11	C24	D9
	B12	C25	D10
		C32	D11
		C33	D13
			D14
			D16

Obter información, desenvolver experimentos e interpretar resultados

A1 B2 C3 D1
A2 B4 C4 D2
A3 B7 C5 D3
A4 B10 C7 D4
A5 B11 C10 D5
B12 C25 D6
C31 D7
C32 D8
C33 D9
D10
D11
D15
D17

Comprender a proxección social da produción animal e a súa repercusión no exercicio profesional	A1	B2	C7	D1
	A2	B3	C10	D2
	A3	B4	C16	D3
	A4	B7	C18	D6
	A5	B10	C33	D7
		B11		D9
		B12		D10
				D11
				D12
				D14
				D16
				D17
				D18

Coñecer e manexar os conceptos, terminoloxía e instrumentación científico-técnica relativos á produción animal			C3	D2
			C4	D4
			C5	D5
			C7	D6
			C19	D9
			C24	D16
			C25	
			C31	
			C32	

Contidos

Topic	
Capítulo I: Bases fisiolóxicas da produción animal (Profesor Soengas)	Tema 1. Sistemas produtivos Tema 2. Reprodución e crecemento Tema 3. Benestar animal
Capítulo II: Alimentación e nutrición animal (Profesor Soengas)	Tema 4. Alimentación animal Tema 5. Nutrición animal Tema 6. Formulación e procesamento de dietas
Capítulo III: Sanidade e hixiene (Profesor García)	Tema 7. Control de hixiene e sanidade da produción primaria gandeira Tema 8. Control da hixiene e sanidade da produción acuícola
Capítulo IV: Lexislación (Profesor García)	Tema 9. Lexislación en materia de produción animal
Capítulo V: Mellora animal (Profesor Rolán)	Tema 10. Base xenética dos caracteres cuantitativos Tema 11. Heredabilidade e a súa utilidade en produción animal Tema 12. Mellora por selección artificial Tema 13. Outras estratexias de mellora

Planificación

	Class hours	Hours outside the classroom	Total hours
Lección maxistral	11	28	39
Resolución de problemas	5	15	20
Seminario	3	24	27
Prácticas de laboratorio	16	8	24
Seminario	2	0	2
Lección maxistral	11	27	38

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Metodoloxía docente

Description

Lección maxistral	Capítulos I e II (Fisioloxía) Realizaranse na aula correspondente, co total dos alumnos matriculados presentes. Nelas comentaranse, coa axuda de presentacións en power point, os fundamentos teóricos da materia. Os materiais docentes estarán a disposición dos alumnos na Plataforma de teledocencia
Resolución de problemas	Realizaranse na aula correspondente, co total dos alumnos matriculados presentes. Nelas resolveranse problemas e casos prácticos
Seminario	Elaboración e exposición por grupos de alumnos de temas integrativos sobre a produción de especies concretas -Proporanse temas para que os preparen os alumnos organizados en grupos de 2-3 (dependendo do número de alumnos matriculados). Os temas que se propoñan abarcarán o máximo número de grupos de animais posibles incluíndo gandería, produción de aves, acuicultura e produción doutras especies de interese. - Na primeira reunión con cada grupo tipo B realizarase a planificación da elaboración dos distintos temas. Na segunda reunión tipo B farase un seguimento da preparación dos temas. - Antes das datas de exposición cada grupo de alumnos deberá entregar unha memoria escrita do traballo realizado. - Nas tres últimas sesións de grupo A exporanse os temas por parte dos alumnos para a continuación debater sobre os mesmos.
Prácticas de laboratorio	A asistencia ás prácticas é obrigatoria para superar a materia. Os alumnos realizarán 16h de prácticas, das cales: - 8h corresponden a Fisioloxía (Avaliación de índices de crecemento e parámetros de composición nun modelo de produción a pequena escala) - 4h corresponden a sanidade e hixiene (diagnóstico) - 4h corresponden a mellora animal (simulación por computador dun proceso de selección artificial)
Seminario	Dedicaranse á planificación e seguimento dos temas elaborados polos distintos grupos de alumnos
Lección maxistral	Capítulos III, IV e V (Sanidade e Mellora) Realizaranse na aula correspondente, co total dos alumnos matriculados presentes. Nelas comentaranse, coa axuda de presentacións en power point, os fundamentos teóricos da materia. Os materiais docentes estarán a disposición dos alumnos na Plataforma de teledocencia

Atención personalizada

Methodologies	Description
Lección maxistral	Serán interactivas e permitirán establecer accións personalizadas de reforzo. Contémplase tamén a resolución de dúbidas e problemas a través do correo electrónico e o sistema de aula virtual de cada profesor
Prácticas de laboratorio	Durante a realización das prácticas de laboratorio os profesores darán atención individualizada a cada alumno para a correcta comprensión dos obxectivos experimentais e da metodoloxía ou técnica utilizada. Unha vez rematada a tarefa, cada alumno ou grupo de alumnos verá supervisado o seu traballo polo profesor Contémplase tamén a resolución de dúbidas e problemas a través do correo electrónico e o sistema de aula virtual de cada profesor
Seminario	Serán interactivas e permitirán establecer accións personalizadas de reforzo. Contémplase tamén a resolución de dúbidas e problemas a través do correo electrónico e o sistema de aula virtual de cada profesor
Resolución de problemas	Serán interactivas e permitirán establecer accións personalizadas de reforzo Contémplase tamén a resolución de dúbidas e problemas a través do correo electrónico e o sistema de aula virtual de cada profesor
Lección maxistral	Serán interactivas e permitirán establecer accións personalizadas de reforzo. Contémplase tamén a resolución de dúbidas e problemas a través do correo electrónico e o sistema de aula virtual de cada profesor

Avaliación

Description	Qualification Training and Learning Results
-------------	---

Lección maxistral	Exame de preguntas obxectivas e preguntas de desenvolvemento sobre os contidos do bloque de Fisioloxía Para superar a materia esíxese un mínimo de 3 puntos (sobre 10) no exame	30	A1 A3 A4 A5	B3 B10 B12	C10 C16 C17 C18 C19 C20 C21 C23 C24 C25 C31 C32 C33	D1 D2 D3 D6 D7 D8 D16
Seminario	Valorarase: -Calidade da memoria escrita presentada (organización, redacción, adecuación da bibliografía, enfoque e profundidade axietados ó tema) -Calidade da presentación oral (adecuación ó tempo, calidade da información presentada nas figuras, expresión oral, capacidade de transmisión de información, dominio da linguaxe técnica) -Respostas ás preguntas expostas.	30	A2 A3 A4 A5	B2 B7 B10 B11 B12	C10 C16 C17 C18 C19 C20 C24 C25 C32 C33	D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D14 D15 D16 D17 D18
Prácticas de laboratorio	A asistencia a prácticas é obrigatoria. Cada un dos tres módulos de prácticas (fisioloxía, sanidade e mellora) avaliaranse por separado por asistencia, informe de prácticas (fisioloxía) ou preguntas (mellora e sanidade). O 50% da nota corresponde ao módulo de Fisioloxía animal. Os módulos de mellora e sanidade representan o 25% cada un.	10	A2 A3	B4 B12	C3 C4 C5 C7 C10 C16 C21 C24 C25 C31 C32	D1 D2 D3 D5 D7 D8 D9 D10 D11 D12 D13 D14 D16
Lección maxistral	Exame de preguntas obxectivas e preguntas de desenvolvemento sobre os contidos do bloque de Sanidade e resolución de problema no bloque de mellora Para superar a materia esíxese un mínimo de 3 puntos (sobre 10) no exame	30	A1 A3 A4 A5	B3 B10 B12	C10 C16 C17 C18 C19 C20 C21 C23 C24 C25 C31 C32 C33	D1 D2 D3 D6 D7 D8 D16

Other comments on the Evaluation

1) Avaliación continúa

É obrigatorio realizar as prácticas da materia. A non realización das mesmas suporá un suspenso na calificación global aínda que se superen o resto de actividades previstas.

Para superar a materia deberá realizar obrigatoriamente todas as actividades propostas.

Para poder superar a materia esíxese unha cualificación mínima en cada un dos exames de 3.

As actividades superadas na primeira oportunidade dun curso se conservan para a segunda oportunidade. Na segunda oportunidade dun curso non se poden recuperar prácticas

Aos alumnos repetidores conservaráselles dun curso para o seguinte as calificacións das actividades (prácticas e seminario) superadas no(s) curso(s) anterior(es). Se repetirán só as actividades suspensas. Non se pode repetir as actividades xa superadas

2) Avaliación global

No prazo establecido polo decanato de Bioloxía os alumnos interesados o solicitarán. Non se aceptarán solicitudes fora de prazo

É obrigatorio realizar as prácticas da materia. A non realización das mesmas suporá un suspenso na calificación global aínda que se superen o resto de actividades previstas.

Para superar a materia deberá realizar obrigatoriamente o seminario

Na data de avaliación da primeira ou segunda oportunidade fará un exame cun valor do 60% que incluírá todos os bloques da materia.

O calendario académico pódese consultar no seguinte enlace: <http://bioloxia.uvigo.es/gl/docencia/horarios>

O calendario de exames pódese consultar no seguinte enlace: <http://bioloxia.uvigo.es/gl/docencia/exames>

Bibliografía. Fontes de información

Basic Bibliography

Caravaca, F.P., **Bases de la producción animal**, Universidad de Sevilla, 2003

Damron, W.S, **Introduction to animal science**, Pearson, 2012

Wadsworth, J., **Análisis de los sistemas de producción animal**, FAO,

Caballero Rúa, Armando, **Genética cuantitativa**, Síntesis, 2017

Complementary Bibliography

Broom, D.M., **Farm animal behaviour and welfare**, CABI, 2006

Buxadé, C, **Zootecnia: bases de producción animal, vol I**, Mundi-Prensa,

Buxadé, C., **Zootecnia: bases de producción animal, vol II (reproducción y alimentación)**, Mundi-Prensa,

Cervera, C, **Bases biológicas de la producción animal: alimentación animal**, Editorial UPV,

Dryden, G, **Animal nutrition science**, CABI, 2008

Falconer, D.S., **Introducción a la genética cuantitativa**, Acribia, 2001

Fontdevila, A, **Introducción a la genética de poblaciones**, Síntesis, 1999

Fraser, D, **Understanding animal welfare**, Blackwell science, 2008

Griffiths, A.J.F., **Genética moderna**, McGraw-Hill, Interamericana, 2000

Herranz, A., **Bienestar animal**, Ministerio de agricultura, 2003

Sainsbury, D., **Animal health: health, disease and welfare of farm livestock**, Cornell University, 1983

Sotillo, J.L, **Producción animal e higiene veterinaria**, Universidad de Murcia, 2000

Recomendacións

Subjects that it is recommended to have taken before

Fisioloxía animal I/V02G030V01502

Fisioloxía animal II/V02G030V01602

Xenética II/V02G030V01505

Inmunoloxía e parasitoloxía/V02G030V01604

Microbioloxía II/V02G030V01605

Técnicas avanzadas en bioloxía/V02G030V01504

Other comments

Para o correcto seguimento da materia o alumno deberá inscribirse ao principio de curso na plataforma de teledocencia. Na inscrición, é importante que inclúa a dirección de correo-e que utiliza habitualmente, para poder recibir información do seu profesorado de forma personalizada.

IDENTIFYING DATA**Microbial Production**

Subject	Microbial Production			
Code	V02G030V01908			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Sieiro Vázquez, Carmen			
Lecturers	Sieiro Vázquez, Carmen			
E-mail	mcsieiro@uvigo.es			
Web				

General description Microbial biotechnology studies microorganisms, and the processes they carry out on a large scale, with the aim of producing products of applied and commercial interest in the health, agri-food and environmental fields. The subject covers the different knowledge, fundamental and applied, related to industrial production processes, as well as the search, selection and improvement of the microbial strains involved. The most relevant products currently being produced by micro-organisms and future prospects for new applications are examined.

The schedule of the subject can be consulted at the following link:
<http://bioloxia.uvigo.es/es/docencia/horarios>

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.

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 be 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.
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.
C5	Growing microorganisms, cells, tissues and organs.
C6	Assessing and interpreting metabolic activities.
C7	Manipulating and analysing genetic data and carrying out genetic counseling
C16	Growing, producing, transforming, improving biological resources as well as getting profits.
C17	Identifying and obtaining natural biological products
C18	Producing, transforming, controlling and preserving Agro-Food products.
C19	Identifying, addressing and communicating Agro-Food and environmental risks.
C20	Designing, using and supervising biotechnological processes.

C24 Designing biological process models.

C25 Gathering background information, develop experimental work and analysing data results

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

D3 Development of oral and writing communication abilities

D6 Research and interpreting of information from different sources

D8 Development of the ability of independent learning

D10 Development of the critical thinking

D11 Adquisition of an ethical agreement with the society and the profession

D14 Adquisition of abilities in the interpersonal relationships

D16 Acceptance of a quality commitment

Expected results from this subject

Expected results from this subject	Training and Learning Results			
Know the selection and improvement of the industrial microorganisms as well as the appearances related with the microbial biotechnology	A1 A2 A3 A4	B3 B12	C6 C7 C16	D1 D3 D6 D8
Know the systems of processed and purification of the products of microbial origin	A1 A2 A3 A4	B3 B12	C16 C18 C20	D1 D3 D6 D8
Know the legislation and relative rules to the microbial production	A1 A2 A3 A4	B3 B11 B12	C19 C20 C24 C29	D3 D6 D8
Isolate, identify, handle and analyse microorganisms and/or his cellular and molecular constituents of interest in microbial production	A2 A5	B3 B4	C5 C6 C17 C31	D10 D16
Manipulate and analyse the genetic material in the processes of improvement of the industrial microorganisms	A2 A5	B3 B4	C7 C16 C31	D10 D11
Apply knowledges and relative technology to the microbial production in appearances related with the production, exploitation, analysis and diagnostic of processes and biological resources	A1 A2 A5	B4 B10	C5 C6 C16 C18 C20 C24	D10 D11 D16
Obtain information, develop experiments and interpret results	A1 A2 A3 A4 A5	B2 B3 B7 B10 B12	C25	D1 D6
Comprise the social projection of the microbial production and his repercussion in the professional exercise	A3 A5	B7 B11	C29 C33	D11
Apply knowledges of microbial production to advise, supervise and *peritar on scientific appearances-technical, ethical, legal and partner-economic related with the living beings and environment	A2 A3 A4	B4 B7 B10 B11	C19 C29	D3 D10 D11 D14
Know and handle the concepts, terminology and scientific instrumentation-technical relative to the microbial production	A1 A2 A3 A4 A5	B2 B3	C31 C32	D3

Contents

Topic

1-Introduction to Microbial Biotechnology:
Historical Development, Socioeconomic
Importance and Legislation

2-Microbial Metabolism and Production:
Regulation and Metabolic Strategies for
Hyperproduction

3-Production Technology (I): Culture media and
industrial sterilization, industrial fermentation and
product recovery and processing

4-Production Technology (II): Development of
industrial strains (search, selection and
improvement of strains)

5-Microbial food production: alcoholic beverages,
dairy products and novel foods obtained by
fermentation

6-Microbial production of drugs: antimicrobials,
vaccines, hormones and other products of
therapeutic interest

7-Microbial production of enzymes, amino acids,
pigments and vitamins

8-Production of organic acids, solvents and
biofuels

9-Microbial Polymers Production: Polysaccharides,
Bioplastics and Biosurfactants

10-Microbial Biomass Production as an Industrial
Product: SCP, Probiotics, Bioinsecticides and
Biofertilizers

PRACTICES

The practices will consist of laboratory sessions
and/or case studies related to:

The isolation, characterization, selection,
typification and improvement of microorganisms
of industrial interest

Planning

	Class hours	Hours outside the classroom	Total hours
Laboratory practical	13.5	3	16.5
Seminars	10	32	42
Lecturing	23	39	62
Objective questions exam	0.5	5	5.5
Objective questions exam	0.25	3	3.25
Objective questions exam	0.25	10	10.25
Objective questions exam	0.25	5	5.25
Objective questions exam	0.25	5	5.25

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Laboratory practical	The students will get experience in the characterisation, selection and improvement of microorganisms of industrial interest, as well as in the study of the processes in which they are involved.
Seminars	I. The students, guided by the teacher, will document (search, evaluate, classify and select information) on a topic related to the program of the subject (or on a part of such topic) and, with the selected material, will prepare a summary. II. Students will work on the topic for which they have researched by completing a worksheet and preparing a presentation, which they will present to their classmates and the teacher. They will have a discussion with the teacher and their classmates about the topic and will resolve any questions that arise in relation to it.
Lecturing	Exhibition, by the professor, of the contents on the matter object of study, theoretical bases and/or guidelines of a work, exercise or project to develop by the student

Personalized assistance

Methodologies	Description
Lecturing	Personalized attention will be given during tutorial hours.
Laboratory practical	Personalized attention will be given during tutorial hours.

Assessment			
	Description	Qualification	Training and Learning Results
Seminars	BIBLIOGRAPHIC DOCUMENTATION: Abstract delivered considering the ability to seek to value, classify and select information, as well as the ability to structure, synthesize, criticize and interrelate the contents. Students will have a rubric that will detail the aspects that will be evaluated (5%). WORK/PRESENTATION AND EXPOSITION: The worksheet elaborated by the students on the topic will be considered, as well as the exposition (capacity to synthesize, explain and transmit the information) that they carry out and the presentation (design and selection of the support material) that they use in the exposition. The ability to resolve questions and issues related to the topic will also be taken into account. Students will have a rubric that will detail the aspects that will be evaluated (10 %). OBJECTIVE TEST on the contents of the seminars (10%)	25	A1 B2 C17 D1 A2 B7 C24 D3 A3 B10 C25 D6 A4 B11 C29 D8 A5 B12 C32 D10 C33 D14 D16
Objective questions exam	Exam with objective questions about PRACTICAL SESSIONS	15	
Objective questions exam	Exam with objective questions on the theoretical concepts of the INTRODUCTION AND GENERAL ASPECTS OF THE SUBJECT	10	
Objective questions exam	Exam with objective questions on the theoretical aspects of PRODUCTION TECHNOLOGY	20	
Objective questions exam	Exam with objective questions on the theoretical aspects of MICROBIAL PRODUCTION (I)	15	
Objective questions exam	Exam with objective questions on the theoretical aspects of MICROBIAL PRODUCTION (II)	15	

Other comments on the Evaluation

1.- The evaluation will be preferably continuous according to the qualification of the activities/test above mentioned. It is essential to achieve a grade of 5/10 to pass the subject. It will be necessary to achieve a minimum grade of 4/10 in each of the activities/tests to pass the subject. In case of not achieving the minimum grade required in any of the activities/tests, the grade that will appear in the report card will be the highest failing grade achieved by the student.

Attendance to practicals and seminars is compulsory for all students, being allowed to miss only one session if the absence is duly justified. The non-attendance to the practicals sessions and/or seminars, as well as the non-submission of group work, is not recoverable in the second or successive calls, preventing also to pass the global evaluation (in the case of students who have opted for this mode of evaluation).

The grade obtained in the different continuous evaluation tests (practicals, seminars, lectures), as long as it reaches the minimum of 4/10, will be kept for the July exam, so in this exam the student will only take the tests that he/she has not passed in the first exam.

2.- Alternatively, the student may opt for a single global evaluation test. The grades obtained in the practicals and seminars will be transferred to the final grade of this evaluation. The student must declare on the date established by the Center his or her intention to opt for the global evaluation, which will prevent him or her from taking the continuous evaluation.

DATES OF EXAMINATIONS

They can be consulted in the following link:

<http://bioloxia.uvigo.es/es/docencia/examenes>

Sources of information

Basic Bibliography

Okator N. and Okeke B., **Modern Industrial Microbiology and Biotechnology**, 2nd ed., CRC Press, 2021

Wilson D.B., Sahm H., Stahmann K-P and Koffas M., **Industrial Microbiology**, First ed., Wiley, 2020

Glazer A.N. and Nikaido H., **Microbial Biotechnology. Fundamentals of Applied Microbiology**, 2nd ed., Cambridge University Press, 2008.

Byong H. Lee, **Fundamentals of Food Biotechnology**, 2nd ed., Wiley-Blackwell, 2015.

Hutkins R.W., **Microbiology and Technology of Fermented Foods**, First ed., IFT Press. Blackwell Publishing, 2008.

Singh V, **Microbial Cell Factories Engineering for Production of Biomolecules**, First ed., Elsevier, 2021

Complementary Bibliography

Primrose S.B. and Twyman R.M., **Principles of gene manipulation and genomics**, 7th ed., Blackwell Science, 2014.

Bora S.K., Sarma K. and Das S., **An Approach to Microbial Biotechnology. A Laboratory Handbook**, First ed., LAP Lambert Academic Publishing, 2013.

Recommendations

Subjects that are recommended to be taken simultaneously

Quality management and control/V02G030V01911

Subjects that it is recommended to have taken before

Genetics II/V02G030V01505

Microbiology II/V02G030V01605

Advanced techniques in biology/V02G030V01504

Microbiology I/V02G031V01204

IDENTIFYING DATA				
Plant Production				
Subject	Plant Production			
Code	V02G030V01909			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	Spanish			
Department				
Coordinator	Barreal Modroño, M. Esther			
Lecturers	Barreal Modroño, M. Esther Canchaya Sanchez, Carlos Alberto Gallego Veigas, Pedro Pablo			
E-mail	edesther@uvigo.es			
Web	http://bioloxia.uvigo.es/es/			
General description	The subject will provide the student with skills in four areas: plant production systems and good practices, plant breeding and reproduction techniques (plant biotechnology), plant safety and health, legislation and regulations. The subject includes master classes, seminars, case studies in cooperative learning, and practical laboratory classes. 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. http://bioloxia.uvigo.es/gl/docencia/horarios			

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 be 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.
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.
C3	Identifying, analysing and characterizing biological samples, including those of human origin, and possible anomalies.
C4	Isolating, analysing and identifying biomolecules, viruses, cells, tissues and organs.
C5	Growing microorganisms, cells, tissues and organs.
C7	Manipulating and analysing genetic data and carrying out genetic counseling
C10	Analysing and assessing the adaptation of living beings to the environment.
C16	Growing, producing, transforming, improving biological resources as well as getting profits.
C17	Identifying and obtaining natural biological products
C18	Producing, transforming, controlling and preserving Agro-Food products.
C19	Identifying, addressing and communicating Agro-Food and environmental risks.
C20	Designing, using and supervising biotechnological processes.
C21	Processing and interpreting bioassays and biological diagnoses.
C23	Developing, managing and using biological control techniques.
C24	Designing biological process models.

C25	Gathering background information, develop experimental work and analysing data results
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 writing 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
D15	Development of creativity, initiative and entrepreneurial spirit
D16	Acceptance of a quality commitment
D17	Development of the self-criticism ability

Expected results from this subject

Expected results from this subject	Training and Learning Results			
To know the main plant production systems	A1	B10 B12	C16 C18 C32	D6 D8 D12 D13 D14 D16
To understand plant reproduction and improving techniques	A1	B10 B12	C16 C17 C18 C32	D6 D8 D10 D14 D15 D16
To know the basic concepts in plant biotechnology	A1 A5	B3 B10	C16 C17 C18 C32	D6 D8 D10 D13 D14 D15 D16
To know the basic principles of plant safety and hygiene	A1 A5	B2 B3 B10 B12	C7 C16 C17 C18 C19 C32	D6 D8 D10 D11 D12 D13 D14 D15 D16
To know the legislation and regulations in plant production	A5	B3 B10 B12	C7 C16 C17 C18 C19 C20 C29 C32	D5 D6 D10 D11 D12 D13 D14 D15 D16

To apply knowledge of plant production to isolate, identify, manage and analyze specimens and samples of biological origin, as well as to characterize their cellular and molecular constituents.	A2	B2	C3	D2
	A3	B4	C4	D5
		B7	C5	D6
			C7	D7
			C23	D8
			C25	D10
				D14
				D15
				D16
				D17
To analyze and interpret the adaptations of living beings to the environment	A2	B3	C3	D1
	A5	B4	C4	D6
		B10	C5	D7
			C10	D10
			C23	D13
				D14
				D15
				D16
				D17
To apply knowledge and technology relating to plant production in aspects related to the production, harvesting, analysis and diagnosis of biological processes and resources	A2	B4	C3	D5
	A4	B10	C4	D6
		B11	C5	D7
			C7	D8
			C19	D10
			C23	D14
			C25	D15
				D16
To obtain information, perform experiments and interpret results	A3	B2	C5	D1
		B7	C7	D2
		B10	C20	D3
			C21	D4
			C23	D5
			C24	D6
			C25	D7
			C31	D8
				D9
				D10
To apply knowledge of plant production to advise, supervise and assess scientific-technical, ethical, legal and socio-economic aspects related to living beings and the environment	A3	B2	C3	D2
	A5	B3	C4	D3
		B7	C5	D5
		B10	C7	D6
			C19	D7
			C23	D8
			C25	D11
			C29	D12
			C33	D15
				D16
Understanding the social projection of plant production and its impact on professional practice	A3	B2	C7	D6
		B7	C19	D10
		B10	C20	D11
		B12	C33	D13
				D15
				D16
				D17
To know and manage the concepts, terminology and scientific-technical instrumentation related to plant production	A2	B4	C5	D2
	A4	B10	C7	D4
		B11	C20	D5
		B12	C31	D15
				D16

Contents

Topic

Block 1: Production systems (Plant Physiology Area).	Topic 1. Basis of Plant Production.
Block 1: Production systems (Plant Physiology Area).	Topic 2. Plant Production Techniques
Block 2: Plant Breeding (Genetic Area)	Topic 3. Fundamentals of Plant Breeding
Block 2: Plant Breeding (Genetic Area)	Topic 4. Fundamentals of Genomic Selection
Block 3: Plant Biotechnology (Plant Physiology Area)	Topic 5. Introduction to Plant Biotechnology
Block 3: Plant Biotechnology (Plant Physiology Area)	Topic 6. Genetic transformation of plants
Block 4: Plant health and legislation.(Plant Physiology Area)	Topic 7. Plant Health
Block 4: Plant health and legislation. (Plant Physiology Area)	Topic 8. Intellectual property and standards.
Practice	1. Water stress and plant production 2. Introduction to adventitious morphogenesis 3. Poor plant nutrition and its impact on yield

Planning			
	Class hours	Hours outside the classroom	Total hours
Introductory activities	1	0	1
Lecturing	23	46	69
Problem solving	6	6	12
Seminars	6	6	12
Laboratory practical	12	24	36
Objective questions exam	1	7	8
Report of practices, practicum and external practices	0	4	4
Case studies	0	8	8

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
	Description
Introductory activities	A class will be dedicated to the presentation of the subject and the teaching guide, with an explanation of the evaluation procedure and indication of the deadlines for the work.
Lecturing	The master sessions are 50-minute lessons, to explain and develop the contents of Plant production. They must be completed with autonomous work of the student consulting books of text and further reading, mainly scientific articles.
Problem solving	Cooperative learning is formulated based on problems and cases.
Seminars	Seminar methodology is formulated with collaborative work and presentation of teamwork for the agricultural systems section.
Laboratory practical	These are mandatory laboratory practices consisting of familiarization of students with basic plant culture techniques and plant biotechnology.

Personalized assistance	
Methodologies	Description
Lecturing	Throughout the term, teachers will be available in person at their offices during tutoring hours. It is recommended to make an appointment by mail to avoid crowds, you wait and/or the teacher has a busy schedule that day.
Problem solving	Consultations can be made by e-mail or through the MOOVI platform, in addition to being able to use face-to-face tutorials
Seminars	Tasks will be carried out to solve problems and exercises that will be dealt with in the same seminar.
Laboratory practical	The laboratory sessions will include a temporary space to perform tasks that will serve as training for the realization of the practice report.

Assessment		
	Description	Qualification Training and Learning Results

Objective questions exam	The final exam will consist of objective questions related to the learning achieved.	30	A1 A3 A5 B10 B12	B2 B3 B4 C18 C19	C7 C16 C17 C18 C19 C32	D1 D3 D6 D8 D12
Report of practices, practicum and external practices	Presentation of a final report in which the methodology, materials, data obtained, statistical analysis, graphic representation and discussion of the results obtained will be presented, including all the literature consulted.	40	A3 A4 A5 B7 B10 B11	B2 B3 B4 C10 C16 C17	C3 C4 C5 C10 C16 C17 C19 C20 C21 C23 C24 C25 C31 C33	D2 D4 D5 D6 D7 D9 D10 D11 D13 D14 D15 D16 D17
Case studies	The evaluation of the seminars will be done through collaborative work (plant physiology) and problem solving of individual form (Genetics) together with the delivery of a small report or an objective test.	30	A1 A5 B10 B12	B2 B3 C19 C29 C32	C3 C19 C29 C32	D1 D3 D6 D8 D17

Other comments on the Evaluation

Given that the training and continuous evaluation activities programmed within the Laboratory Practices and Seminars are designed to train students in skills and competences directly related to the exercise of the profession in the field of biotechnology applied to plant production, the attendance and participation of students in both evaluable activities is mandatory, in such a way that the absence or unjustified non-performance of these activities will prevent passing the subject. Therefore, considering the practical nature and the results of training and learning that are sought to achieve with both methodologies, students who opt for the global evaluation mode must also perform these activities.

It will be essential to obtain in each of the parts, at least 40% of the total evaluation, to compensate.

Students who do not meet this requirement at the first opportunity will be graded on the transcript with the highest grade achieved in the failed parts, and must repeat at the second opportunity (July) the test related to the part or parts in which they have not reached the 4.0. Logically, students who find themselves in this situation will keep the grade of the part/s passed (≥ 4.0) in the first opportunity and of the Practicals and Seminars, to take them into account in the final grade. In the second opportunity, it will also be essential to reach 4.0 in all the parts subject to recovery. The reports of practices and seminars that must be passed in the second call will be done individually. In the case of internships, once passed, the grade will be kept for the following year.

Ethical aspects, plagiarism will be prosecuted in the works, as well as copying from other students during the evaluation tests, which may be cause for a reduction of the grade and even a failure in the subject. This fraudulent conduct will be sanctioned with the firmness and rigor established by current regulations and may result in the suspension of the course for an entire academic year.

The dates of the exams are indicated in the following link:

<http://bioloxia.uvigo.es/es/docencia/examenes>

Sources of information

Basic Bibliography

Parker, R, **La Ciencia de las Plantas**, 1ª, Editorial Paraninfo, 2000

Ferreira, JJ; Ordás, A y Pérez M, **La genética de los caracteres cuantitativos en la mejora vegetal del siglo XXI**, 1ª, Sociedad Española de Genética y Sociedad Española, 2012

David P. Clark y Nanette J. Pazdernik, **Biotechnology**, 2ª, Elsevier, 2016

Anis M. y Ahmad N., **Plant tissue culture: propagation, conservation and crop improvement**, 1ª, Springer, 2016

Caballero, A., **Genética Cuantitativa**, 1ª, Editorial Síntesis, 2017

Complementary Bibliography

Cubero, JL, **Introducción a la mejora genética vegetal**, 2ª, Ediciones Mundi Prens, 2002

Casal, I; García-López, JL; Guisán, JM y Martínez Zapater, JM, **La Biotecnología Aplicada a la Agricultura**, 1ª, Eumedica S.A., 2000

Varshney, RK y Tuberosa, R, **Genomics-Assisted Crop Improvement**. Springer, 1ª, Springer, 2007-2010

Recommendations

Subjects that continue the syllabus

Drafting and execution of projects/V02G030V01801

Final Year Dissertation/V02G030V01991

Subjects that are recommended to be taken simultaneously

Quality management and control/V02G030V01911

Animal production/V02G030V01907

Microbial Production/V02G030V01908

Subjects that it is recommended to have taken before

Plant physiology I/V02G030V01503

Plant physiology II/V02G030V01603

Genetics II/V02G030V01505

IDENTIFYING DATA				
Management and Conservation of spaces				
Subject	Management and Conservation of spaces			
Code	V02G030V01910			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	#EnglishFriendly Spanish Galician			
Department				
Coordinator	Calviño Cancela, María			
Lecturers	Calviño Cancela, María Soto González, Benedicto			
E-mail	maria@uvigo.es			
Web				
General description	This subject is focused on natural areas, their management and conservation, as a basis for an ecosystem-centred conservation of biodiversity, in contrast with the the more conventional approach of species-centred conservation. The subject encompasses general topics about natural areas, types of protected areas and general principles for their design and planning, their socio-economic context as well as planning and management tools. 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. Schedule: #http://bioloxia.uvigo.es/*gl/*docencia/schedules			

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 be 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
C15	Describing, analysing, evaluating and planning of the physical environmental. Intepreting the scenery.

C22	Identifying, describing and using bioindicators.
C25	Gathering background information, develop experimental work and analysing data results
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 writing 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
D15	Development of creativity, initiative and enterpreneurial spirit
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			
New	A1	B2	C13	D1
	A2	B3	C25	D2
	A3	B4	C32	D3
	A4	B5	C33	D4
	A5	B7		D5
		B10		D6
		B11		D7
		B12		D8
				D9
				D10
				D11
				D12
				D13
				D14
				D15
				D16
				D17
				D18
New	A1	B2	C1	D1
	A2	B3	C11	D2
	A3	B4	C12	D3
	A5	B5	C13	D4
		B7	C15	D5
		B10	C22	D6
		B12	C25	D7
			C31	D8
			C32	D9
			C33	D10
				D11
				D12
				D13
				D14
				D15
				D16
				D17
				D18

New	A1	B2	C11	D1
	A2		C12	D2
	A3		C13	D3
			C15	D4
			C25	D5
			C32	D6
			C33	D7
				D8
				D9
				D10
				D11
				D12
				D13
				D14
				D15
				D16
				D17
				D18
New	A3		C1	D1
			C11	D2
			C12	D3
			C13	D4
			C15	D5
			C22	D6
			C25	D7
			C31	D8
			C32	D9
			C33	D10
				D11
				D12
				D13
				D14
				D15
				D16
				D17
				D18
New	A1	B2	C13	D1
	A3	B3	C32	D2
		B7	C33	D3
		B10		D4
				D5
				D6
				D7
				D8
				D9
				D10
				D11
				D12
				D13
				D14
				D15
				D16
				D17
				D18

New	A1	B4 B5	C1 C11 C12 C13 C15 C22 C25 C31 C32 C33	D1
				D2
				D3
				D4
				D5
				D6
				D7
				D8
				D9
				D10
				D11
				D12
				D13
				D14
				D15
				D16
				D17
				D18
New	A2 A3 A4 A5	B10 B11	C13	D1
				D2
				D3
				D4
				D5
				D6
				D7
				D8
				D9
				D10
				D11
				D12
				D13
				D14
				D15
				D16
				D17
				D18
New	A3	B2 B3 B4 B5 B7 B10 B11 B12	C1 C11 C12 C13 C15 C22 C25 C31 C32 C33	D1
				D2
				D3
				D4
				D5
				D6
				D7
				D8
				D9
				D10
				D11
				D12
				D13
				D14
				D15
				D16
				D17
				D18

New	A2 A4		C33	D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 D16 D17 D18
New	A1 A2 A3 A4 A5	B2 B3 B4 B5 B7 B10 B11 B12	C31 C32	D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 D16 D17 D18

Contents

Topic

Part I. Soil and Water Conservation.	Chapter 1. Soil degradation and loss. Chapter 2. Soil Conservation Methods. Chapter 3. Land planning tools. Chapter 4. Water Conservation. Chapter 5. River and Riverbank Restauration.
Part II. Habitat loss, biological integrity and ecosystem conservation.	Chapter 6. Habitat destruction, fragmentation and degradation. Chapter 7. Ecosystem-centred conservation.
Part III. Ecosystem Management and Restauration.	Chapter 8. Principles of ecosystem management, uncertainty, and adaptive management. Chapter 9. Replacement, rehabilitation, restauration and improvement of ecosystems.
Part IV. Selection, design and planning of protected areas.	Chapter 10. Selection of priority conservation areas. Chapter 11. Principles of protected area design. Chapter 12. Protected areas types and uses. Chapter 13. Socio-economic aspects of protected areas. Protected areas planning: planning tools in the Spanish legislation.
Field trip and computer session	We will make a field trip to a protected natural area with diverse uses and aims in order to familiarize become familiar with its management. We will make one computer session to work with useful tools for management and planning of protected natural areas.

Planning

	Class hours	Hours outside the classroom	Total hours
Seminars	3	0	3
Field practice	11	0	11
Practices through ICT	3	0	3
Problem solving	6	0	6

Mentored work	2	30	32
Lecturing	12	34	46
Lecturing	13	36	49

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
	Description
Seminars	Critical discussions about controversies related with natural areas conservation and management.
Field practice	Field trip to a protected natural area with diverse uses and aims in order to become familiar with its management.
Practices through ICT	Practices through ICT Computer session to work with useful tools for management and planning of protected natural areas.
Problem solving	Problem solving for students to get familiar with concepts related with the conservation and management of the soil and water.
Mentored work	Mentored work The students will prepare an assignment related to topics of interest for conservation and management of natural areas.
Lecturing	Chapters in Part I will be explained by the teacher from the Edaphology area.
Lecturing	Chapters in Parts II, III and IV will be explained by the teacher from the Ecology area.

Personalized assistance

Methodologies	Description
Lecturing	All the students queries related to this part will be attended in the class or tutorials, done by appointment requested by email to the teachers: maria@uvigo.es and edbene@uvigo.es, also available at https://moovi.uvigo.gal/ .
Seminars	All the students queries related to this part will be attended in the class or tutorials, done by appointment requested by email to the teachers: maria@uvigo.es and edbene@uvigo.es, also available at https://moovi.uvigo.gal/ .
Field practice	All the students queries related to this part will be attended in the class or tutorials, done by appointment requested by email to the teachers: maria@uvigo.es and edbene@uvigo.es, also available at https://moovi.uvigo.gal/ .
Practices through ICT	All the students queries related to this part will be attended in the class or tutorials, done by appointment requested by email to the teachers: maria@uvigo.es and edbene@uvigo.es, also available at https://moovi.uvigo.gal/ .
Mentored work	All the students queries related to this part will be attended in the class or tutorials, done by appointment requested by email to the teachers: maria@uvigo.es and edbene@uvigo.es, also available at https://moovi.uvigo.gal/ .
Lecturing	All the students queries related to this part will be attended in the class or tutorials, done by appointment requested by email to the teachers: maria@uvigo.es and edbene@uvigo.es, also available at https://moovi.uvigo.gal/ .
Problem solving	All the students queries related to this part will be attended in the class or tutorials, done by appointment requested by email to the teachers: maria@uvigo.es and edbene@uvigo.es, also available at https://moovi.uvigo.gal/ .

Assessment		Qualification	Training and Learning Results		
	Description				
Practices through ICT	The students will have to solve an exercise in the computer session that will be assessed.	5	B3 B4	C25	D2 D3 D4 D5 D9 D13 D14
Problem solving	The approach used to solve the problem as well as the correction of the result will be assessed.	10	B3 B4	C25	D2 D3 D4 D5 D9 D13 D14

Mentored work	The assessment of this part will be based on the ability for synthetize, analyse and correctly express in writing the contents of the topic chosen as well as knowledge on the topics relevant to the subject.	20	A2 B2 A4 B7 A5 B10 B11 B12	D1 D2 D3 D4 D6 D8 D9 D10 D13 D14 D15 D18
Lecturing	The assessment of this part will be based on the knowledge the student has acquired on the topics explained in the lectures regarding Part I, given by the Area of Edaphology, as demonstrated in a short-questions exam.	26	A1 B3 B5	C13 D1 C15 D2 C22 D3 C32 D4 D6 D10 D12 D13 D16 D17
Lecturing	The assessment of this part will be based on the knowledge the student has acquired on the topics explained in the lectures regarding Parts II, III and IV, given by the Area of Ecology, as demonstrated in a short-questions exam.	39	A1 B3 B5	C13 D1 C15 D2 C22 D3 C32 D4 D6 D10 D12 D13 D16 D17

Other comments on the Evaluation

It is required to obtain a minimum score of 5 (out of 10) in each of the main parts of the subject (final exam and mentored work) in order to pass the subject. In case this score is not reached in any of the parts, the final mark will be that of the lower score. Attendance to the practical classes (field trip, computer sessions and problem solving classes) is compulsory.

In calls other than the first the marks will be based on an exam only. The scores obtained in the assignments will only be kept for the second call.

Students that do not attend the exam will be considered as missing the call, regardless whether they completed the assignments.

Exam dates: please check the following link: <http://bioloxia.uvigo.es/es/docencia/examenes>

Sources of information

Basic Bibliography

Complementary Bibliography

- Ausden, Malcolm, **Habitat management for conservation : a handbook of techniques**, 2007,
- Calviño Cancela, María, **Conservación de espacios protegidos**, Ecología, Conservación I,
- Eagles, Paul F. J., **Turismo sostenible en áreas protegidas: directrices de planificación y gestión.**,
- Lucas, P. H. C., **Protected landscapes : a guide for policy-makers and planners**, Chapman & Hall,
- Mitsch & Jorgensen, **Ecological Engineering and Ecosystem Restoration**,
- Shafer, Craig L., **Nature reserves : island theory and conservation practice**, Smithsonian Institution Press,
- Thomas & Packham, **Ecology of Woodlands and Forests**,
- Dudley, N., **Directrices para la aplicación de las categorías de gestión de áreas protegidas**,
- Begon, M.; Harper, J.L.; Townsend, C.R., **Ecología**,
- Bennet, A.F., **Enlazando el paisaje. El papel de los corredores y la conectividad en la conservación de la vida silvestre**,
- Chape, S.; Spalding, M.; Jenkins, M., **The world's protected areas. Status values and prospects in the 21st century**,
- Hunter, M.L.; Gibbs, J., **Fundamentals of conservation biology**,
- Primack, R.B.; Ros, J., **Introducción a la biología de la conservación**,
- Sodhi, Navjot S.; Ehrlich, Paul R., **Conservation Biology for all**,
- Whittaker, J.; Fernandez-Palacios, J.M., **Island biogeography. Ecology, evolution and conservation**,
- Sutherland, William; Hill, David, **Managing Habitats for Conservation**,

Recommendations

Subjects that are recommended to be taken simultaneously

Environmental analysis and diagnosis/V02G030V01902

Biodiversity: management and conservation/V02G030V01905

Environmental impact evaluation/V02G030V01904

Subjects that it is recommended to have taken before

Ecology I/V02G030V01501

Ecology II/V02G030V01601

IDENTIFYING DATA**Quality management and control**

Subject	Quality management and control			
Code	V02G030V01911			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	Spanish			
Department				
Coordinator	Gallardo Medina, Mercedes Cal Arca, Ángela María			
Lecturers	Cal Arca, Ángela María Gallardo Medina, Mercedes			
E-mail	ANGELA.CAL@UVIGO.ES medina@uvigo.es			
Web				
General description	The aim of this course is for the student to know and understand the principles of quality management and of the environment, as well as the rules of organization and effective management of a laboratory. In this respect, may acquire competence in the application of the ISO 9000 quality management standard, ISO 14000 of environmental management and ISO 17025 for the management and technical competence of testing and calibration laboratories.			
	The schedule of the subject is approved in the Faculty Board and can be consulted in the following link: http://bioloxia.uvigo.es/en/teaching/schedules			

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 be 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.
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.
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.
C30	Controlling and counselling on every aspect related to Organisms Welfare.
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
D6	Research and interpreting of information from different sources

D11 Adquisition of an ethical agreement with the society and the profession

D13 Sensitivity for environmental issues

D14 Adquisition of abilities in the interpersonal relationships

D16 Acceptance of a quaility commitment

D18 Development of negotiating power

Expected results from this subject

Expected results from this subject	Training and Learning Results			
To know the standards of management and quality control of processes, systems, research, etc., related to Biology.	A1	B2 B3	C27 C32 C33	D1 D6 D13 D16
Understand the concept of quality systems and their application. Manage and apply the main systems of quality.	A1 A2	B3	C27 C31	D2 D6 D13 D16
Knowledge and get used to methods of validation, calibration, uncertainty calculation, verification tests, quality standards and other parameters and quality systems.	A2	B2 B4	C31 C32	D6 D13 D16
Knowing how to evaluate, verify and accredit quality.	A2 A5	B4 B7 B11	C27 C30	D1 D2 D13 D14 D16 D18
Understand the importance and impact of the implementation of quality systems in professional and social fields.	A4	B10 B11	C27 C33	D11 D13 D14 D16 D18
Obtain information, evaluate and interpret results	A3	B2 B7 B10	C25	D2
Apply knowledge of quality management to advise, supervise and assess scientific-technical, ethical, legal and socio-economical aspects related to biology.	A2 A3	B10 B12	C29	D2 D6 D11 D13 D14 D16 D18
To know and handle the concepts, terminology and scientific-technical instrumentation related to quality management.	A1 A4	B4 B11	C32	D6 D13 D16

Contents

Topic	
Block 1.- The Quality Management System	Subject 1. The Quality management: concept and historical evolution Subject 2. Design and implementation of a Quality Management System
Block 2.- Models and standards for the Quality management	Subject 3. Quality Management. UNE-EN-ISO 9000 Subject 4. Environmental management: UNE-EN-ISO 14000. EMAS Subject 5. Quality management in the laboratory: standards and techniques. Regulation UNE-EN ISO/IEC 17025
Block 4.- Tools for the Quality management	Subject 6. Tools for the Quality management Subject 7. The continuous improvement and the participatory management of the quality
Seminars and ABPs	Develop in small groups a project for a company, organisation or institution on the implementation of an integrated quality and environmental management system, applying ISO 9000 and ISO 14000 standards.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	20	0	20

Project based learning	5	20	25
Discussion Forum	2	0	2
Essay	20	60	80
Project	5	10	15
Objective questions exam	1	5	6
Presentation	0	2	2

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
	Description
Lecturing	Exposure by the teachers of the contents on the subject of study, theoretical bases and/or guidelines of a work, exercise or project to be developed by the student
Project based learning	Carrying out activities to integrate theoretical knowledge, management tools and formal quality management standards and models. Students, working in small groups, must develop an integrated project on the application of quality and environmental management systems, using the ISO 9000 and ISO 14000 standards as a tool. With this, students are expected to train, among others, the skills of analysis and synthesis, cooperative learning, organisation, information search, communication and strengthening of personal relationships.
Discussion Forum	The activity takes place in a face-to-face environment in which various topics related to the academic and/or professional field are discussed with renowned professionals who carry out their main work activity in the field of quality.

Personalized assistance

Methodologies	Description
Lecturing	Students can ask any questions they may have during the lectures by e-mail. On the other hand, each lecturer sets aside 6 hours of tutoring per week for students who request it. The timetable for these tutorials will be announced by the subject coordinator, but will also be available to students both in the subject area on the Moovi platform and on the Faculty's website.
Project based learning	In these activities, the teacher has the function of guiding and orienting the students' learning process and helping them to successfully carry out the planned project. To this end, effective monitoring will be carried out focused on the equipment configured to carry it out. Likewise, all the material will be available on the Moovi Platform with a summary of the theoretical class presentations, some examples of previous projects that will be progressively uploaded to the platform throughout the course, as well as standards and other useful documents for carrying out the project. On the other hand, students will also be able to resolve their doubts individually in the hours allocated to tutorials, which, as indicated in the previous section, will be communicated through the subject coordinator and will be available on the subject's space in Moovi, as well as on the Faculty's website.

Assessment

	Description	Qualification	Training and Learning Results			
Lecturing	Class attendance will be randomly checked throughout the course.	5	A1 A5	B2 B3 B7 B10 B12	C29 C30 C31 C32 C33	D1 D6 D11 D13 D16
Essay	The practical sessions will be complemented with the individual delivery through the Moovi platform of the tasks performed during each practical. These deliverables may be subsequently completed and improved within the deadline established for each delivery. This methodology is part of the continuous evaluation.	30	A2 A3 A4 A5	B2 B4 B7 B10 B11 B12	C25 C27 C29 C30 C31 C32 C33	D1 D2 D6 D11 D13 D14 D16 D18
Project	The project will be carried out in groups (2 to 3 students). On the established date (usually 10-15 days prior to the date of the final exam), each group of students will submit the written project as a result of the Project Based on Learning, carried out during the practical sessions. This methodology is part of the continuous evaluation.	30	A2 A3 A4 A5	B2 B4 B7 B10 B11 B12	C25 C27 C29 C30 C31 C32 C33	D1 D2 D6 D11 D13 D14 D16 D18

Objective questions	It will be carried out in the final exam. It will allow to evaluate the theoretical knowledge imparted in the teaching sessions, as well as the acquired competences. They may include closed questions with different answer alternatives (true/false, multiple choice, matching of elements, etc.).	25	A1 A5	B2 B3 B7 B10 B12	C29 C30 C31 C32 C33	D1 D6 D11 D13 D16
Presentation	It will be carried out in the final exam. The group of students will carry out the presentation and defense of their project.	10	A3 A4	B11 B12	C27 C32 C33	D1 D14 D18

Other comments on the Evaluation

CONTINUOUS EVALUATION

In order to pass the subject, students must complete the following activities: work, project, presentation, exam, and achieve a minimum grade of 5 points out of 10. Nevertheless, the different activities can be compensated if a minimum grade of 4/10 points is achieved on them. In case of not reaching the minimum grade in the Project section (4/10) or in the exam of objective questions (4/10), the grade obtained will be the one that appearing as the subject final grade (the rest of the sections will not be taken into account). During the theoretical classes, four attendance controls will be carried out randomly. Each control will value 0.125 points that will have an impact on the final grade of the subject.

Exam

In order to take the theoretical exam it is necessary to attend the practical sessions. Non-attendance of a practical for justified reasons must be documented within 24 hours after the end of the practical.

Project

This is the final report of the project carried out during the practical sessions. The quality of the project presented, its originality, usefulness and possible practical application will be evaluated. In addition, it will also be taken in account:

- The inclusion of qualitative aspects of scientific rigor, bibliographical references and the use of scientific terminology.
- Formal appearance of the report: organization, format and style of writing, inclusion of logos, as well as spelling, grammatical and punctuation errors, bad expressions, etc.

Work

The work developed by the student will be evaluated in the classroom during the practical sessions. This will be reflected in a deliverable that must be uploaded to the Moovi platform at the end of each practical session. In order to complete and improve each section of the project carried out during the internship, it will be valued the fact of uploading to Moovi an improvement of the work done in the practices (complete information, aspects of organization and format, etc.), within the deadlines assigned for this purpose. On the other hand, the participation and interest shown by the student in the classroom during the internship will also be valued.

Presentation

The evaluation of the presentation takes in account if it includes the key ideas of the project, the student's ability to convey a clear idea of the project to third parties and him/her fluently in the presentation.

SECOND OPPORTUNITY

In the second opportunity the student will be able to recover the following activities of the subject: project, presentation and exam of objective questions. The 'work' part is not recoverable and therefore must be passed during the class period of the course.

In the case of the project, if it was not passed at the first opportunity, the student may correct and complete the corresponding parts or, if necessary, repeat the entire project.

GLOBAL EVALUATION

Students may request a global evaluation, according to the dates and procedure established by the center, and it will entail the waiver of the continuous evaluation. The global evaluation will allow obtaining 100 % of the score of the subject through a test on the official date set for the final exam of the subject, both in the first and second opportunity.

The test will include an exam of objective questions and the written and oral presentation of the Project.

Academic and Examination Calendars

The academic calendar can be consulted at: <http://bioloxia.uvigo.es/es/docencia/horarios>

The exam calendar can be consulted at: <http://bioloxia.uvigo.es/es/docencia/examenes>

Ethical aspects

Plagiarism in papers and the unjustified use of artificial intelligence programs will be prosecuted. Copying from other students during the evaluation tests may also be a reason for a grade reduction and a failure in the subject.

Sources of information

Basic Bibliography

Camisón C, **Gestión de la calidad: conceptos, enfoques, modelos y sistemas**, 2006

Cuatrecasas L; Gonzalez Babón J, **Gestión integral de la calidad. Implantación, control y certificación.**, 2017

Llorens Montes F.J., **Gestión de la Calidad Empresarial: fundamentos e implantación**, 2005

Complementary Bibliography

López Lemos, Paloma, **Como documentar un sistema de Gestión de calidad según ISO 9001:2015**, 2015

Vilar Barrio JF, **Las Siete nuevas herramientas para la mejora de la calidad**, 2017

Cláver Cortés E, **Gestión de la calidad y gestión medioambiental**, 2011

López Lemos, Paloma, **Novedades ISO 9001:2015**, 2015

Varios autores, **Herramientas para la Calidad**, 2004

Woodside G, **Auditoría de sistemas de gestión ambiental: introducción a la norma ISO 14001**, 2001

Enríquez Palomino A. y Sánchez Rivero, M., **ISO 14001: 2015 Implantación de Sistemas de Gestión Ambiental**, Confemetal, 2018

Seoáñez Calvo Mamp; Angulo Aguado L, **Manual de gestión medioambiental de la empresa: sistemas de gestión medioambiental, auditorías medioambientales, evaluaciones de impacto ambiental y otras estrategias**, 1999

Rubio Romero JC, **Gestión de la prevención de riesgos laborales: OHSAS 18001 - Directrices OIT para su integración con calidad y medioambiente**, 2002

Recommendations

Subjects that continue the syllabus

Internships/V02G030V01981

Drafting and execution of projects/V02G030V01801

Final Year Dissertation/V02G030V01991

Subjects that are recommended to be taken simultaneously

Agri-food analysis and diagnostic/V02G030V01901

Clinical diagnosis and analysis/V02G030V01903

Environmental analysis and diagnosis/V02G030V01902

Biodiversity: management and conservation/V02G030V01905

Pollution/V02G030V01906

Environmental impact evaluation/V02G030V01904

Management and Conservation of spaces/V02G030V01910

Animal production/V02G030V01907

Microbial Production/V02G030V01908

Plant Production/V02G030V01909

IDENTIFYING DATA				
Internships				
Subject	Internships			
Code	V02G030V01981			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	2nd
Teaching language	#EnglishFriendly Spanish Galician English			
Department				
Coordinator	Pérez Fernández, Juan			
Lecturers	Pérez Fernández, Juan			
E-mail	jperezf@uvigo.es			
Web	http://bioloxia.uvigo.es/gl/docencia/practicas-externas/			
General description	The internships will allow students to acquire skills related to the performance of the biologist's professional profiles. In addition, this subject will facilitate direct contact between the Faculty and the professional world, to which the graduates should be incorporated. 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.			

Training and Learning Results				
Code				
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.			
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.			
C1	Obtaining, managing, preserving, describing and identifying current biological organisms and fossils.			
C12	Cataloguing, mapping, assessing, preserving, restoring and managing natural and biological resources.			
C13	Assessing environmental impact. Diagnosing and solving environmental issues			
D1	Development of capacity of analysis and synthesis			
D5	Use of computer resources related to the study field			

Expected results from this subject				
Expected results from this subject	Training and Learning Results			
To gain experience of the socio-occupational environment related to the fields of Biology and understand the applicability of the knowledge acquired throughout the degree.	A2 A3	B2 B5 B7		
To obtain information, develop experiments and interpret results.	A3	B2 B3	C1	
To take part in the execution of projects related to Biology.	A3	B2 B3 B4 B5 B7	C1 C12 C13	D5
Understanding the social projection of External Internships and their repercussions on professional practice.		B7	C13	D1
To know and use the concepts, terminology and scientific-technical instrumentation related to External Internships.		B3	C1	

Contents

Topic

The student will carry out an internship in some - labour and professional real environments related with any of the fields in Biology (environment, production, health, research, development and innovation, etc), under the supervision of a tutor in the receptor institution and a tutor in the Faculty.

Planning

	Class hours	Hours outside the classroom	Total hours
Practicum, External practices and clinical practices	120	0	120
Report of practices, practicum and external practices (Repetida non usar)	0	30	30

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Practicum, External practices and clinical practices	The student will carry out an internship in the host institution for a minimum of 120 hours. In addition, the student will devote 30 hours of work to prepare the final memory of the internship, which has to be elaborated following the rules of external practices for the Degree in Biology.

Personalized assistance

Methodologies	Description
Practicum, External practices and clinical practices	Each student will have a tutor in the external institution (external tutor) who will supervise the correct development of the practices.
Tests	Description
Report of practices, practicum and external practices (Repetida non usar)	Each student will have a tutor in the faculty (academic tutor) who will guide the student with the editorial of the internship memory.

Assessment

	Description	Qualification	Training and Learning Results			
Practicum, External practices and clinical practices	Daily follow-up by the tutor of the receptor institution ("external" tutor) of the activity developed by the student during the period of the internship. Then, the "external" tutor will evaluate the activity developed by the student during the period of the internship.	75	A2 A3	B2 B3 B4 B5 B7	C1 C13	D1 D5
Report of practices, practicum and external practices (Repetida non usar)	The "academic" tutor will review and will evaluate the memory of the internship drafted by the student. The "academic" tutor will do the final grade of the internship by considering the report of the tutor of the receptor institution (75 %) and the final memory drafted by the student (25 %).	25	A2	B2 B4	C12 C13	D5

Other comments on the Evaluation

The adjudication of honours will be between those students coursing the curricular internship and having the best qualifications. For this, those that wish to opt to the honour will have to do an oral presentation and defence of the internship memory in front of a committee

The instructions to prepare the memory of the internship will be available on the web page of the faculty in the following link:

<http://bioloxia.uvigo.es/en/teaching/external-internships/>

The student has to fill out and deliver a report on the company.

The memory of the internship and the reports can be sent in pdf format by email.

Sources of information**Basic Bibliography****Complementary Bibliography**

Recommendations

Other comments

The student has to have surpassed a minimum of 120 ECTS to be allowed to initiate his/her external curricular internship.
The rule for the external extracurricular internship also contemplates the same requirement.

IDENTIFYING DATA				
Final Year Dissertation				
Subject	Final Year Dissertation			
Code	V02G030V01991			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	18	Mandatory	4th	2nd
Teaching language	#EnglishFriendly Spanish Galician			
Department				
Coordinator	Míguez Miramontes, Jesús Manuel			
Lecturers	Míguez Miramontes, Jesús Manuel			
E-mail	jmmiguez@uvigo.es			
Web	http://http://bioloxia.uvigo.es/gl/docencia/traballo-fin-de-grao			
General description	The Final Degree Project is a mandatory subject of 18 ECTS that is part of the module Final Degree Project and Work. This module develops in the last year of the degree program in Biology. The objective of the End of Degree Project is to offer the students the opportunity to apply knowledges, skills and competences acquired during the Degree studies. The project consists in an original work that each student will carry out individually under supervision of a teacher (tutor), and will allow to demonstrate in an integrated way the acquisition of competences and skills associated with the title. Compliance with the regulations approved for the project is mandatory for all students of this subject. The management of all the processes corresponds to the Final Degree Project Committee, which has been appointed for this proposal by the Faculty. The subject does not have a fixed schedule in the academic calendar, although all the activities are usually developed throughout the second semester of the academic year.			

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 be 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
B1	Ability of organization and planning in the working area in a multidisciplinary environment relate to biology and other connected fields.
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.
B6	Ability to use biological knowledge obtained with this degree in a professional context by reasoning and presenting the ideas clearly, backed up and based on a solid general and specific education.
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.
B8	Ability to draft and write independent reports or projects related to the biological field. Communicate through verbal or written presentations and develop a logical argument in a professional context where it is shown skills acquired in this degree program.
B9	Motivation to achieve innovative and proactive actions based on accomplished background from courses attended, background from current topics checked (I+D) (Research and Development, Environment, Biomedicine, Bio production...) and background obtained from internships made in the business network.
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.
C25	Gathering background information, develop experimental work and analysing data results
C26	Participating in conducting, writing and producing projects on Biology
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 writing 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	Acquisition of an ethical agreement with the society and the profession
D12	Respectful behaviour to diversity and multiculturalism
D13	Sensitivity for environmental issues
D14	Acquisition of abilities in the interpersonal relationships
D15	Development of creativity, initiative and entrepreneurial spirit
D16	Acceptance of a quality 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			
The aim of the Final Degree Project is that the student put knowledge and skills acquired during the Degree into practice.	A1	B1		D1
	A2	B2		D2
	A3	B3		D3
	A4	B4		D4
	A5	B5		D5
		B6		D6
		B7		D7
		B8		D8
		B9		D9
		B10		D10
		B11		D11
		B12		D12
				D13
To apply knowledge, abilities and technologies of biology in aspects related to the development and implementation of management systems and quality control.				D14
				D15
				D16
				D17
To obtain information, develop projects and interpret results.				D18
	A2	B4	C27	D11
		B8		D16
		B12		
	A2	B1	C25	D2
	A3	B2	C26	D6
		B7		D7
		B8		D8
				D11
				D15

To participate in the direction, writing and execution of projects of biological scope.

A2	B1	C25	D2
A5	B2	C26	D5
	B4	C27	D6
	B6	C33	D7
	B8		D9
	B12		D11
			D15
			D16
			D18

To understand the social projection of biology and its impact on professional practice, as well as to know how to use knowledge to teach and disseminate.	A3 A4	B7 B11	C33	D3 D11
To apply the knowledge acquired for advising, supervise and assess scientific, technical, ethical, legal and socio-economic aspects related to biology.	A3 A4	B6 B7	C29	D7
To know and to handle concepts, terminology and scientific-technical instrumentation related to biology.	A4	B4	C31 C32	D3 D4 D5

Contents

Topic

The Final Degree Project does not have its own (*)-contents. However, the details of its organization are indicated below.

The subject Final Project will be organized on the basis of three activities that the student will have to carry out appropriately:

1. Development of an original work related to one of the multiple fields of biology or its professional application. The type of project should be limited to these sections:

The work will be done under the supervision of a professor (tutor) assigned to this subject. -Experimental work that is developed in the laboratories of the faculty of Biology or in other UVigo research centers of biological scope.

There are different types of final degree project for which students can choose: -Theoretical development (design, planning, applicability) of a project of economic, social, environmental, educational interest, etc., related to the field of biology, or biology-based technology.

-Type A: offered by professors of the degree. At the beginning of the academic year students must choose a project topic among those offered. -Literature review projects whose objective is a possible practical application (initial study for a project, innovative case, etc.)
The Final Degree Project Committee will establish the norms and deadlines that will govern the awarding to the students of the topics proposed by the professors. -Other projects corresponding to the offer of professors that do not specifically comply with the above modalities. They must be approved by the Final Degree Project Committee.

- Type B: proposed by students and agreed with a professor of the degree who will supervise the work. - Work applied to biology carried out in external public and private institutions.

-Type C: proposed by students to be carried out in institutions other than the UVIGO with which there is an agreement. This type of work will imply the existence of an academic tutor from the institution and a person from the external entity who will act as a co-tutor.

-Type D: subject to students with special educational needs.

-Type E: developed by students within the framework of a mobility program.

The particular characteristics of each of these types of work, as well as the rules that govern them, are included in the regulations of the Final Degree Project in Biology.

2. Delivery of a written report in time. It will be focus on the project carried out by the student. The characteristics of the report and the deadlines for delivery will be established sufficiently in advance by the Final Degree Project Committee.
3. Presentation and defense of the work before an Evaluating Board that will evaluate and grade it. The rules of presentation and defense of the project will be established by the Final Degree Project Committee, in agreement with the approved rules.

Planning			
	Class hours	Hours outside the classroom	Total hours
Mentored work	20	380	400
Project	1	39	40
Presentation	1	9	10

*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 final degree project will be carried out under the supervision of a professor (tutor). The function of the tutor will consist on supervising and guiding the student in the subject, methodology, elaboration, presentation and any other academic aspect related to the final project. The rules governing the tutorial function are included in the Regulations for the Final Degree Project of the University of Vigo and the Faculty of Biology.

Personalized assistance	
Methodologies	Description
Mentored work	An academic supervisor will guide the student during the completion of the final degree project. He will monitor the work and participate in its evaluation, in agreement with the regulations approved for this subject.
Tests	Description
Project	The student will develop an original project autonomously and under the supervision of a tutor, in which he/she will demonstrate the skills acquired during the degree. At the end of the project, he/she must present the results of the project in a report, according to the established rules. The student will also make a presentation of the report in front of the examining board, the project and the report constituting the highest percentage of the grade obtained in the subject. The tutor will also supervise the report and the presentation, helping the student to complete the final project.

Assessment			
	Description	Qualification	Training and Learning Results
Mentored work	The supervisor will issue a tutorial evaluation report that includes different items aimed at assessing the acquisition of competences and skills by the student. The tutor's rubric model is approved by the Final Degree Project committee. The following link address to a model used in the 2022-23 academic course, which can serve as a reference for the 2023-24 academic course. http://bioloxia.uvigo.es/docs/docencia/grado/tfg/TFG_informe_tutor.pdf	30	A1 B1 C25 D1 A2 B2 C26 D2 A3 B3 C27 D3 B4 C29 D4 B5 C31 D5 B6 C32 D6 B7 C33 D7 B8 D8 B9 D9 B10 D10 B12 D11 D12 D13 D14 D15 D16 D17 D18
Project	The student must submit a report of the project in which the main details of the work done will be included. In the following link you can consult the rules for the elaboration of the report in the academic year 2022-23, which can serve as a reference for the academic year 2023-24. https://bioloxia.uvigo.es/gl/docencia/traballo-fin-de-grao/	40	A1 B2 C25 D1 A3 B5 C26 D3 A5 B7 C27 D6 B9 C32 D7 C33 D10 D12 D13 D14
Presentation	The student must make a presentation of the project in front of the panel and discuss with its members about the different aspects of the work done.	30	A2 B6 C32 D3 A4 B8 D5 B11 D15

Other comments on the Evaluation

End of Degree Project Evaluation Board

The Evaluation Board will be formed by three professors of the degree and will be appointed at the proposal of the Final Degree Project committee. As many boards as necessary will be formed, with their corresponding alternate members, to guarantee the proper development of the evaluation process.

End of Degree Project report

With sufficient time in advance, the Final Degree Project committee will establish the deadlines for the presentation and defense, as well as the delivery of a project report. Failure to submit the report within the established deadline will result in the non-presentation to the evaluation process.

Students will have a regulation for the elaboration and presentation of the report. For the 2023-24 academic year, these regulations will be available on the faculty website and on the teaching platform.

Presentation and defense of the Final Degree Project

The Evaluating Board will publish in advance the order of presentation, place and time of the evaluation sessions, which will be available to all students.

Grades

At the end of the evaluation process, the Evaluating Board will publish jointly the grades received by the students.

If a student passes the tutor's evaluation, but obtains a failing grade in any other section of the Final Degree Project, the examining board will provide the student and his/her tutor with a report containing recommendations for improving the work at the next opportunity. In particular, it will be emphasized if the negative grade obtained by the student can be recovered in a second opportunity in the same course or if, on the contrary, the student must complete the whole work in another academic year.

Second chance

The student may recover in a second opportunity of the same term those aspects that did not exceed in the first, as long as the report obtained by the evaluating board in the first opportunity so specified.

The Final Degree Project Committee will establish in advance the terms that will govern the evaluation process in the second opportunity. It will include the deadlines for the submission of the defense request and the tutor's report. It will also specify the date, place and time of the presentation and defense of the project.

Schedule

The final degree project does not have an established schedule; each student will establish their schedule according to the supervisor, usually during the second term of the academic year.

Dates scheduled for the evaluation in the 2023-24 academic year

Official dates were approved in the Faculty Board. See link: <http://bioloxia.uvigo.es/es/docencia/examenos>

Applicable regulations

The Final Degree Project Regulations of the University of Vigo, approved in "Consello de Goberno" is available at: http://www.uvigo.gal/opencms/export/sites/uvigo/uvigo_gl/DOCUMENTOS/alumnado/TFGNovo_Def_Uvigo.pdf

The Regulations of the Faculty of Biology for the completion of the Final Degree Project, approved in "Xunta de Facultade" is available at: http://bioloxia.uvigo.es/docs/docencia/grado/tfg/normativa_TFG_facultad_bioloxia.pdf

Ethical issues

Plagiarism will be strictly prosecuted in the final degree projects, especially in the elaboration of the final report, being a reason for failure in the subject. The unjustified use of artificial intelligence programs is not allowed either.

Sources of information

Basic Bibliography

Complementary Bibliography

Recommendations

Other comments

Recommendation for enrollment in the course:

- In order to apply to enroll in the Final Degree Project the student must have passed all the necessary credits to obtain the official degree title, except those corresponding to the project itself, either by passing the corresponding subjects or by recognition.

- In order to be able to apply for the presentation and defense of the Final Degree Project, the student should have passed all the necessary credits to obtain the degree, except those corresponding to the project itself, either by overcoming the corresponding subjects or by recognition.

Therefore, it is highly recommended that students register for this subject only if they have a certain security of being able to pass all the credits enrolled in the academic course.

Regulations of the Final Degree Project and information on the planning of the subject in the course are available at:
<http://bioloxia.uvigo.es/en/teaching/end-of-degree-project>

Mobility programs:

Final degree projects can be carried out within a student mobility program, stating their characteristics in the respective study contract. Students who opt for this modality must have the approval of the mobility coordinator of the faculty and the coordinator of the subject Final Degree Project. Therefore, it is recommended that these processes be initiated sufficiently in advance.
