



IDENTIFYING DATA

Biology of the Development of Marine Organisms

Subject	Biology of the Development of Marine Organisms			
Code	V02M098V01212			
Study programme	(*)Máster Universitario en Bioloxía Mariña			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Miguel Villegas, Encarnación de Rodríguez Díaz, Miguel Angel			
Lecturers	Álvarez Otero, Rosa María Miguel Villegas, Encarnación de Rodríguez Díaz, Miguel Angel			
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General description	(*)Nesta materia expónse os principios biolóxicos que rexen o desenvolvemento dos organismos mariños. O curso profundiza: 1) na bioloxía da reprodución e a bioloxía das larvas e embrións das especies animais mariñas. 2) nos mecanismos celulares xerais que subxacen aos procesos de diferenciación e desenvolvemento. A docencia desta materia inclúe clases maxistras e resolución de exercicios e outras actividades propostas polo profesorado. Nas clases maxistras explicaranse os conceptos que se enuncian no temario da materia. Os exercicios e actividades permitirán resolver, debater e argumentar sobre cuestións de interese xeral e actual no campo da bioloxía do desenvolvemento.			

Skills

Code	
A1	(*)Posuír e comprender coñecementos que acheguen unha base ou oportunidade de ser orixinais no desenvolvemento e/ou aplicación de ideas, adoito nun contexto de investigación.
A2	(*)Que os estudantes saiban aplicar os coñecementos adquiridos e a súa capacidade de resolución de problemas en contornos novos ou pouco coñecidos dentro de contextos máis amplos (ou multidisciplinares) relacionados coa súa área de estudo.
A3	(*)Que os estudantes sexan capaces de integrar coñecementos e se enfrontar á complexidade de formular xuízos a partir dunha información que, sendo incompleta ou limitada, inclúa reflexións sobre as responsabilidades sociais e éticas vinculadas á aplicación dos seus coñecementos e xuízos.
A4	(*)Que os estudantes saiban comunicar as súas conclusións, e os coñecementos e razóns últimas que as sustentan, a públicos especializados e non especializados dun xeito claro e sen ambigüidades.
A5	(*)Que os estudantes posúan as habilidades de aprendizaxe que lles permitan continuar estudando dun xeito que terá que ser, en grande medida, autodirixido e autónomo.
B1	Utilización de criterios y métodos científicos en el planteamiento y resolución de problemas aplicando los conocimientos adquiridos
B2	Búsqueda, análisis e integración de información a partir de diferentes fuentes y capacidad para su interpretación y evaluación
B3	Aprendizaje de diversas técnicas y métodos analíticos tanto en el medio natural como en el laboratorio
B4	Desarrollo de habilidades en el manejo y tratamiento de herramientas, matemáticas, estadísticas e informáticas
B5	Desarrollo de la habilidad de elaboración, presentación y defensa de trabajos e informes técnicos
C2	Conocimiento de la diversidad de organismos marinos y sus estrategias adaptativas

C3	Conocimiento y comprensión de las interacciones de los organismos marinos y los ecosistemas marinos y costeros
C8	Conocimiento y manejo de la metodología de investigación, de las técnicas muestreo e instrumentales y de análisis de datos aplicados al medio marino
D1	Desarrollo de las capacidades comprensivas, de análisis y síntesis
D2	Desarrollo de la capacidad de razonamiento crítico y autocrítico
D4	Desarrollo de la capacidad para actualizar el conocimiento de forma autónoma
D5	Desarrollo de las habilidades de comunicación y discusión de planteamientos y resultados

Learning outcomes

Expected results from this subject	Training and Learning Results
(*)Saber implantar os sistemas de calidade e seguridade en laboratorios e empresas de acordo coas normativas vixentes.	
That the student:	A1
- To understand the interactions of the marine organisms and the marine ecosystems and coast systems	A2
- To look for the potential economic interest and biotechnology of the marine organisms	A3
- To purchase knowledge, identify and evaluate the environmental quality of the marine environment and of the valid legislation. It can carry out the direction of environmental consulting	A4
- to know and be able to handle the methodology of investigation, sampling techniques , instrumental and of analysis of data applied to the marine environment.	A5
- To evaluate the quality and safety of food and of products of transformation and biotechnology of marine origin	B1
-To schedule and direct aquariums, museums, centers of environmental interpretation, natural parks and natural spaces protected	B2
- To elaborate, argue, interpret, advise and evaluate scientific-technical reports, ethical, legal and socioeconomic related with the marine environment and fishing	B3
	B4
	B5
	C2
	C3
	C8
	D1
	D2
	D4
	D5

Contents

Topic	
Gametogénesis and Fecundation	Spermatogenesis. Structure of the spermatozooids. Hormonal control. Oogenesis. Structure of the ovule. Fertilization: Contact and recognition of gametes. Acrosomic reaction. Polyspermia. Activation of egg metabolism.
Early development.Organogenesis	Segmentation. Segmentation patterns Gastrulation: Types. Embryonic leaves. Derived ectodermal, neurulation, neural crests and epidermis. Derived mesodermal. Derived endodermic.
Main processes and development concepts	Phases of the ontogenetic development. Patterns of development in marine organisms model. Determination, differentiation, growth, morphogenesis and establishment of the body pattern. Alterations of the pattern: mutations of genes related with development. Modifications of the body plan in the development postembryonic: heterochrony and *allometry. Techniques of study.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	15	34.95	49.95
Presentation	2	8	10
Seminars	1	0	1
Seminars	4	8	12

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

Methodologies

	Description
Lecturing	The professors explain the contents of the subject object of study, theoretical bases and/or guidelines , exercise or project that will develop the student.
Presentation	The professors will use presentations to explain each of the blocks of the subject
Seminars	During the development of the master lessons if the professors wants to be able ask questions to the students that could help to a better understanding of the the subject
Seminars	Activities of different nature that the students will carry out of individual way or in group, destined to a deeper knowledge of the subject.

Personalized assistance	
Methodologies	Description
Lecturing	Master lessons imparted by the professor
Seminars	The professors will realize a continuous assessment of the academic performance of the student, in base to the his intervention in the distinct activities offered.
Presentation	The students will be able to do the questions that they wish in relation to the presentations used by the professor in the master lessons.
Seminars	During the development of the master lessons if the professors wants to be able ask questions to the students that could help to a better understanding of the the subject. And by another part, if the students have any in regard to subject, will be able to contact with the professors through email or physically.

Assessment					
Description	Qualification	Training and Learning Results			
LecturingMaster lessons by videoconference among the three universities where the profesor use presentations to explain different subjects	0				
SeminarsActivities of different nature	30	A1	B1	C2	D1
		A2	B2	C3	D2
		A3	B3		D4
		A4	B4		D5
		A5	B5		

Other comments on the Evaluation

The dates of the final exam are the following: First opportunity: 26 of April (10:00-12:00 h.) Second opportunity: 7 of July (12:00-14:00 h.) The evaluation system of the subject will include a qualification obtained in the official exam of the subject and a qualification derived from the activities carried out during the course. In the final grade of the subject the result of the final exam will have a weight of 7 points and the activities carried out during the course will have a weight of 3 points. The score derived from the activities will only be taken into account for the final grade when the student obtains a score equal or superior to 5 points in the official exam of the subject. The qualification system will be expressed by numerical final grade from 0 to 10 points according to the current legislation (Royal Decree 1125/2003 of September 5, BOE September 18)

Sources of information

Basic Bibliography

Complementary Bibliography

BROWDER, L.W. et al., **Development Biology.**, 1991,

GILBERT, S. F., **Developmental Biology**, 2013,

WOLPERT, L. ET AL. ., **Principles of Development**, última ed,

GILBERT, S.F., **Biología del desarrollo.**, 7ª ed o posterior,

WOLPERT, L. ET AL., **Principios del desarrollo.**, última edición,

NORRIS D.O. et al, **Hormones and Reproduction of Vertebrates - Vol 1: Fishes**, 2010,

Recommendations

Contingency plan

Description

Given the uncertain and unpredictable evolution of the health alert caused by COVID-19, the University of Vigo establishes an extraordinary planning that will be activated when the administrations and the institution itself determine it, considering safety, health and responsibility criteria both in distance and blended learning. These already planned measures guarantee, at the required time, the development of teaching in a more agile and effective way, as it is known in advance (or well in advance) by the students and teachers through the standardized tool.

In the event that the subject has to be developed in the mixed modality (with distancing, partial restrictions on physical attendance), the expository teaching (master classes and seminars), will be carried out totally or partially in a virtual way, since either with synchronous or asynchronous mechanisms. In this scenario, the teaching activities will be taught through the virtual platform or through the way provided by the coordinating university of the degree, through which the students will have access to the teaching content.

The evaluation criteria in this scenario will be the same that are included in the assessment, the tests will be carried out virtually through the platform provided by the university, with visual and audio monitoring of the students. These tests will include the necessary adaptations (limitation of the response time, anti-plagiarism controls ...) to ensure the fairness and proper conduct of the tests. If technical or personal impediments arise that hinder the reliable control of these tests, alternatives of an oral nature with recording will be offered, in order to leave a documentary record of them. The recording may be extended, if necessary, to the exam review sessions.

In the event that the subject has to be developed in a non-face-to-face way (closure of the facilities, impossibility of teaching with physical presence), all the teaching will take place virtually, either with synchronous or asynchronous mechanisms. In this scenario, the teaching activities will be taught through the virtual platform provided by the coordinating university of the degree, through which the students will have access to the teaching content.

The evaluation criteria will be the same that are included in the assessment, the tests will be conducted virtually through the platform provided by the university, with visual and audio monitoring of the students. These tests will include the necessary adaptations (limitation of the response time, anti-plagiarism controls ...) to ensure the fairness and proper conduct of the tests. If technical or personal impediments arise that hinder the reliable control of these tests, alternatives of an oral nature with recording will be offered, in order to leave a documentary record of them. The recording may be extended, if necessary, to the exam review sessions.
