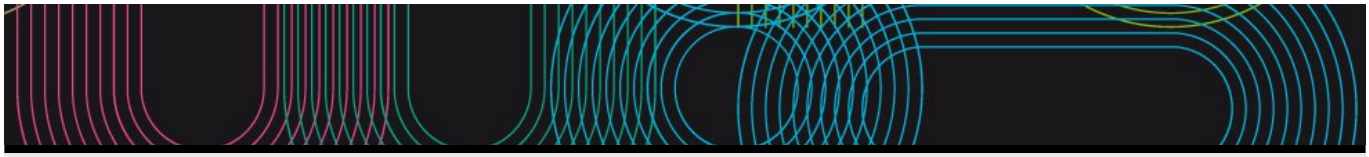

IDENTIFYING DATA				
Physiology of marine organisms				
Subject	Physiology of marine organisms			
Code	V10G061V01305			
Study programme	(*)Grao en Ciencias do Mar			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Lopez Patiño, Marcos Antonio			
Lecturers	Blanco Imperiali, Ayelén Melisa Conde Sieira, Marta Lopez Patiño, Marcos Antonio Pedrol Bonjoch, María Nuria Verde Rodríguez, Antía			
E-mail	mlopezpat@uvigo.es			
Web				
General description	Study of the operation of the marine organisms (animal and vegetal) and of the mechanisms that make possible his adaptation to the half. It will loan special attention the those physiological **appearances mothers related with the integration of the pertinent information of the half marine and the generation of specific answers.			

Competencies	
Code	
A1	Students have demonstrated knowledge and understanding in a field of study that builds upon their general secondary education, and is typically at a level that, whilst supported by advanced textbooks, includes some aspects that will be informed by knowledge of the forefront of their field of study
A2	Students can apply their knowledge and understanding in a manner that indicates a professional approach to their work or vocation, and have competences typically demonstrated through devising and sustaining arguments and solving problems within their field of study
A3	Students have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include reflection on relevant social, scientific or ethical issues
A5	Students have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy
B1	Know and use vocabulary, concepts, principles and theories related to oceanography and apply everything learned in a professional and/or research environment.
B4	Manage, process and interpret the data and information obtained both in the field and in the laboratory.
B5	Develop, implement and write basic or applied projects in oceanography from a multidisciplinary perspective.
C1	know at a general level the fundamental principles of sciences: Mathematics, Physics, Chemistry, Biology and Geology.
C5	Formulate the mass, energy and moment conservation equations for geophysical fluids and solve them in basic oceanic processes.
C6	Acquire the fundamentals and terminology of chemical processes.
C9	Acquire basic knowledge about the structural and functional organization and the evolution of marine organisms.
C10	Know the biological diversity and functioning of marine ecosystems.
C11	Apply the knowledge and techniques acquired to the characterization and sustainable use of living resources and marine ecosystems.
D1	Develop the search, analysis and synthesis of information skills oriented to the identification and resolution of problems.
D2	Acquire the ability to learn autonomously, continuously and collaboratively, organizing and planning tasks over time.
D3	Understanding the meaning and application of the gender perspective in different fields of knowledge and in professional practice with the aim of achieving a more just and equal society.
D4	Ability to communicate orally and in writing in Galician language.
D5	Sustainability and environmental commitment. Equitable, responsible and efficient use of resources.

Learning outcomes

Expected results from this subject	Training and Learning Results			
PLANT PHYSIOLOGY 1. To identify and understand key physiological processes in the development of photosynthetic marine organisms.	A1 A2 A3	B1	C1 C9 C10 C11	D2
2. To know the relationships among the photosynthetic marine organisms and the marine environment by means of the study of changing physiological processes	A1 A2 A3 A5	B1	C1 C9 C10	D2 D5
3. To handle equipments and techniques to study plant physiology.	A2 A3 A5	B1 B4 B5	C11	D2 D3 D4 D5
4. To understand the scientific methodology and the technologies applied to plant physiology research.	A1 A3 A5		C1	D2 D3 D4 D5
5. To gain capacity of analysis and approaching to hypothesis in plant physiology.	A2 A3		C5 C6	D3
6. To know the relationships among the photosynthetic marine organisms and the abiotic and biotic marine environments, by means of the study of their adaptations and the physiological processes of acclimation (functional types, osmoregulation, fotoprotection, biomass partitioning).	A1 A2 A5	B1	C10	D4 D5
ANIMAL PHYSIOLOGY: 7. To know the mechanisms of acquisition and integration of the sensory information in marine animals	A2 A3 A5	B1	C1	
8. To know the physiological bases of muscular activity and its implication in aquatic locomotion	A3	B1	C1	
9. To know in marine animals the mechanisms trough which synthesis, release, transport and the action of hormones synthesised by endocrine glands and the nervous system of marine animals occurr.	A2 A3	B1	C1	
10. Knowing the corporal fluids and the functioning of cardiovascular systems.	A3	B1	C9	
11. To know the mechanisms of gas exchange between the animals and the water where they live.	A3	B1	C1	
12. To know the mechanisms for wastes elimination and of osmotic regulation in distinct groups of marine animals.	A3	B1	C1	
13. To know how animals obtain energy through food consumption, and how to use such energy as well.	A3 A5	B1	C1	D3 D5
15. To know the general and basic terminology in Animal Physiology.	A3	B1	C1	
16. To know and to understand the generel functioning of different systems in animals addapted to different environmental conditions.	A2 A3	B1	C1	D5
17. To understand the general functioning of the animal as a whole, emphasizing in the role played by the integratory and coordinatory systems.	A2 A3	B1	C1 C9 C10	D5
18. To understand basic aphysiology-related aspects, such as aquaculture.	A2 A3 A5	B1	C1 C11	D1 D5

Contents

Topic	
PLANT PHYSIOLOGY:	1. Plant Physiology in the ocean. 2. Cell and tissue basic characteristics photosynthetic marine organisms 3. Water relations in photosynthetic marine organisms. Osmoregulation and osmoprotection. 4. Mineral nutrition in marine environments. 5. Photosynthesis: definition and physiological, ecological and evolutionary relevance. 6. The photosynthetic organelles. 7. Light and photosynthetic pigments. 8. The photochemical phase of photosynthesis. 9. The biochemical phase of photosynthesis. 10. Mechanisms of carbon gain and concentration in photosynthetic marine organisms.

ANIMAL PHYSIOLOGY:	1. Physiological bases of excitability 2. The nervous system and the neural communication 3. Physiology of the systems effectors in marine animals: muscular activity and locomotion, cromatophora and bioluminescence 4. Sensory physiology in marine animals: mecanoreception, electroreception, magnetoreception, quimioreception, fotoreception and vision. 5. Physiology of the neuroendocrine and endocrine systems in marine animals 6. Circulatory fluids and operation of the cardiovascular systems in marine animals 7. Operation of the respiratory systems in marine animals 8. Physiology of excretion and osmorregulation in marine animals 9. Physiology of the digestive systems in marine animals

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	28	70	98
Laboratory practical	10	4	14
Mentored work	0	6	6
Discussion Forum	0	2	2
Seminars	5	15	20
Objective questions exam	0.7	0	0.7
Essay questions exam	1	0	1
Problem and/or exercise solving	0.3	0	0.3
Essay	0	6	6
Debate	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	2-4 weekly hours until complete the planning. To be developed in the corresponding classroom, with all the enrolled students. Theory sessions will be supported by power point presentations. The educational materials will be at the disposal of the students at TEMA platform.
Laboratory practical	The students will assist 3 sessions of practices in the laboratory: two sessions of 2.5 h each in Animal Physiology, one session of 4 h in Plant Physiology, and another session of 1 h in Plant Physiology. The attendance is compulsory.
Mentored work	PLANT PHYSIOLOGY: short Activities of cooperative learning in the classroom, in spontaneous or random groups. Immediate delivery. They are a complement for the evaluation, not compulsory. Each activity delivered can add up to 0.1 points to the final mark of PLANT PHYSIOLOGY, although they do not penalise if they are not delivered.
Discussion Forum	PLANT PHYSIOLOGY, through the platform TEMA: -virtual Forum of review: scientific Articles and websites of cytology and histology of photosynthetic marine organisms -virtual Forum of innovation and state of the art: scientific Articles and websites of physiological /ecophysiological subjects of photosynthetic marine organisms -virtual Exercises proposing questions for the final exam Each quality contribution to the forum can add up to 0.1 points to the final mark of PLANT PHYSIOLOGY, although they do not penalise if you do not participate.
Seminars	In the module of ANIMAL PHYSIOLOGY seminars will be devoted to the planning and exhibition of subjects elaborated by the distinct groups of students In the module of PLANT PHYSIOLOGY seminars will be devoted to the resolution of problems

Personalized assistance

Methodologies	Description
Seminars	Resolution of doubts and difficulties to the groups or personal if necessary. During the seminar and in tutorials, monday and friday from 11:00 to 12:00.
Lecturing	Resolution of doubts and difficulties to the the group or personal if necessary. During the session and in tutorials, monday and friday from 11:00 to 12:00. Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated. To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation.

Laboratory practical	Resolution of doubts and difficulties to the groups or personal if necessary. During the practices and in tutorials, monday and friday from 11:00 to 12:00.
Mentored work	Resolution of doubts and difficulties to the groups the groups or personal if necessary. In the classroom and in tutorials, monday and friday from 11:00 to 12:00.
Discussion Forum	Feedback through the platform TEMA
Tests	**Description**
Essay	Resolution of doubts and difficulties to the groups or personal if necessary. In tutorials, monday and friday from 11:00 to 12:00.
Debate	Feedback through the platform TEMA

Assessment

	Description	Qualification	Training and Learning Results			
Lecturing	Attendance will be valued By means of a final exam comprising the two modules. The weighting per module is 50%. It demands a minimum of 4 each in each module to pass the examination. The final exam will consist on short answer tests, long answer tests, and resolution of exercises.	0	A1 A2 A3 A5	B1 B4 B5	C1 C5 C6	D3 D5
Laboratory practical	In the module of Plant Physiology (5% of the qualification) the evaluation will be by attendance and questions in the final exam. In the module of Animal Physiology (5% of the qualification) the evaluation will be by attendance	10	A1 A2 A3 A5	B1 B4 B5	C1 C5 C9 C10 C11	D1 D5
Mentored work	Voluntary for Plant Physiology	0	A1 A2 A3 A5	B1	C5 C6 C9 C10	D1 D2 D4 D5
Discussion Forum	Voluntary for Plant Physiology	0	A1 A2 A3 A5		C1 C6 C10 C11	D1 D2 D3 D4 D5
Seminars	It is compulsory the attendance to the seminars In the module of Plant Physiology (10% qualification) the assessment will be by attendance and performance, and the problems will be matter of examination. In the module of Animal Physiology (10% qualification) the students in groups of 2-3 will elaborate a memory and will present in public a work of a listing of subjects proposed.	10	A1 A2 A3 A5	B4 B5	C1 C6 C11	D1 D2 D3 D4 D5
Objective questions exam	Mandatory	25	A1 A2	B1	C1 C9 C10 C11	D4
Essay questions exam	Mandatory	35	A1 A2 A5	B1 B5	C1 C9 C10	D4
Problem and/or exercise solving	Mandatory	10	A3	B4	C1 C10	D1 D4
Essay	Mandatory for Animal Physiology	10	A1 A2 A3 A5	B1 B5	C9 C10 C11	D1 D2 D4

Other comments on the Evaluation

To pass the matter demands that the global qualification of each one of the modules (examination, seminars and practical) separately marks no less than 4 points (up to 10).

Students are strongly requested to fulfil a honest and responsible behaviour. It is considered completely unacceptable any alteration or fraud (i.e., copy or plagiarism) contributing to modify the level of knowledge and abilities acquired in exams,

evaluations, reports or any kind of teacher□s proposed work. Fraudulent behaviour may cause failing the course for a whole academic year. An internal dossier of these activities will be built and, when reoffending, the university rectorate will be asked to open a disciplinary record.

Date, time and place of exams will be published in the official web of Marine Sciences Faculty:

http://mar.uvigo.es/index.php/en/alumnado-actual-2/examenes-3

Sources of information

Basic Bibliography

Hill, R.W. et al, **Fisiología animal.**,

Moyes, C. y Schulte, P., **Principios de fisiología animal.**,

Withers, P.C., **Comparative Animal Physiology.**,

Complementary Bibliography

Randall,D. et al., **Fisiología animal.**,

Willmer, P., Stone, G., Johnston, I., **Environmental physiology of animals,**,

Azcón-Bieto J, Talón M, **Fundamentos de Fisiología Vegetal**, 2ª ed. Madrid: McGraw-Hill Interamericana,

Taiz L, Zeiger E, **Fisiología vegetal**, Publicacions de la Universitat Jaume I,

Lobban CS, Harrison PJ, **Seaweed Ecology and Physiology**, Cambridge University Press, New York,

Kirk JTO, **Light and photosynthesis in aquatic ecosystems**, 3rd ed. Cambridge, UK: Cambridge University Press,

Larkum AWD, Robert JO, Duarte CM, **Seagrasses: biology, ecology, and conservation**, Dordrecht (The Netherlands): Springer,

Taiz L et al., **Plant Physiology and Development, Sixth Edition**, Sinauer Associates, Inc.,

Recommendations

Subjects that continue the syllabus

Aquaculture/V10G060V01801

Other comments

Students are strongly requested to fulfil a honest and responsible behaviour. It is considered completely unacceptable any alteration or fraud (i.e., copy or plagiarism) contributing to modify the level of knowledge and abilities acquired in exams, evaluations, reports or any kind of teacher□s proposed work. Fraudulent behaviour may cause failing the course for a whole academic year. An internal dossier of these activities will be built and, when reoffending, the university rectorate will be asked to open a disciplinary record.

Contingency plan

Description

=== EXCEPTIONAL PLANNING ===
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.

=== ADAPTATION OF THE METHODOLOGIES ===

* Teaching methodologies maintained

All. By means of online lessons through telematic teaching-learning on Campus Virtual (https://campusremotouvigo.gal/).

* Teaching methodologies modified

None. If required, lab sessions would be replaced with video and tutorial sessions, and a commented report should be mandatory.

* Non-attendance mechanisms for student attention (tutoring)

By mean of e-mail and virtual offices at Campus Virtual.

* Modifications (if applicable) of the contents:

None

* Additional bibliography to facilitate self-learning:

None

* Other modifications

=== ADAPTATION OF THE TESTS ===

Exams and computer-based tests will be conducted through the platform TEMA.