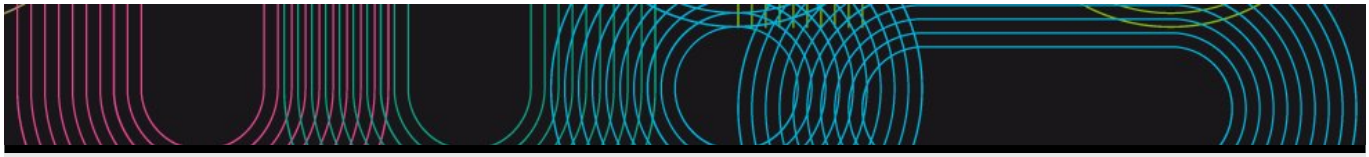

IDENTIFYING DATA				
Physiology of marine organisms				
Subject	Physiology of marine organisms			
Code	V10G061V01305			
Study programme	Grado en Ciencias del Mar			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language	#EnglishFriendly Spanish Galician			
Department				
Coordinator	Pedrol Bonjoch, María Nuria Conde Sieira, Marta			
Lecturers	Blanco Imperiali, Ayelén Melisa Conde Sieira, Marta Pedrol Bonjoch, María Nuria			
E-mail	pedrol@uvigo.es mconde@uvigo.es			
Web	http://https://mar.uvigo.es/			
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. 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 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.
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.
D4	Ability to communicate orally and in writing in Galician language.
D5	Sustainability and environmental commitment. Equitable, responsible and efficient use of resources.

Expected results from this subject	
Expected results from this subject	Training and Learning Results

2. To know the relationships among the photosynthetic marine organisms and the marine environment by means of the study of changing physiological processes	A2 A3 A5	B1	C9 C10	D2 D5
3. To handle equipments and techniques to study plant physiology.	A2 A3 A5	B1 B4 B5	C11	D2 D4 D5
4. To understand the scientific methodology and the technologies applied to plant physiology research.	A3 A5			D2 D4 D5
5. To gain capacity of analysis and approaching to hypothesis in plant physiology.	A2 A3			
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).	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		
8. To know the physiological bases of muscular activity and its implication in aquatic locomotion	A3	B1		
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		
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		
12. To know the mechanisms for wastes elimination and of osmotic regulation in distinct groups of marine animals.	A3	B1		
13. To know how animals obtain energy through food consumption, and how to use such energy as well.	A3 A5	B1		D5
15. To know the general and basic terminology in Animal Physiology.	A3	B1		
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	C9 C10	D5
18. To understand basic aphysiology-related aspects, such as aquaculture.	A2 A3 A5	B1	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	12	12
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
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 PowerPoint presentations. The educational materials will be at the disposal of the students on the Moovi platform.
Laboratory practical	The students will assist 3 sessions of practice in the laboratory: two sessions of 2.5 h each in Animal Physiology, and one session of 5 h in Plant Physiology. 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 to 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 penalize if they are not delivered.
Discussion Forum	PLANT PHYSIOLOGY, through the platform Moovi: -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 penalize 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 personnel 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 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 optimize 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 Moovi
Tests	**Description**
Debate	Feedback through the platform Moovi

Assessment			
	Description	Qualification	Training and Learning Results

Lecturing	Attendance will be evaluated There will be final evaluation tests for both modules. The relative weighting of each will be 50%. A minimum of a 4 in each module is required to pass the exam. The final exam will consist of objective tests, developmental questions and problem solving.	0	A2 A3 A5	B1 B4 B5		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	A2 A3 A5	B1 B4 B5	C9 C10 C11	D1 D5
Mentored work	Volunteer for the module of Plant Physiology. (Short collaborative learning activities in the classroom, in spontaneous or random groups. Immediate delivery. They are complementary to the evaluation, not mandatory. Each classroom activity delivered raises one tenth of the final grade of PLANT PHYSIOLOGY, although they do not penalize if they are not delivered).	0	A2 A3 A5	B1	C9 C10	D1 D2 D4 D5
Discussion Forum	Voluntary for the module Plant Physiology (Each quality contribution to the forums adds one tenth to the final grade of PLANT PHYSIOLOGY, although they do not penalize if you do not participate).	0	A2 A3 A5		C10 C11	D1 D2 D4 D5
Seminars	Attendance is mandatory for the continuous evaluation, given its experimental and practical nature. In the Plant Physiology module, the mark will be based on attendance and performance (5%), and the problems will be subject of the exam. In the Animal Physiology module, students in groups of 2-3 will elaborate a work to be presented in the classroom, and the mark will be based on attendance and performance (15%). For the students who opt for the global evaluation, the delivery of the report of problems of Plant Physiology and the work of Animal Physiology is voluntary and can raise the final mark up to two points.	20	A2 A3 A5	B1 B4 B5	C9 C10 C11	D1 D2 D4 D5
Objective questions exam	Mandatory	25	A2	B1	C9 C10 C11	D4
Essay questions exam	Mandatory	35	A2 A5	B1 B5	C9 C10	D4
Problem and/or exercise solving	Mandatory	10	A3	B4	C10	D1 D4

Other comments on the Evaluation

To pass the subject, it is required that the overall qualification of each of the modules (exams, seminars and practices) separately is not less than 4 points.

The exams of the Animal Physiology module will take place during class hours once the theoretical module is finished. The exams and problem-solving of the Plant Physiology module will be held once the theoretical module has been completed on the date, time, and place of the official evaluation exams, which will be published on the official website of the Faculty of Marine Sciences (http://mar.uvigo.es/alumnado/examenes/).

All exam and delivery dates will be published on the teledocency platform Moovi. **The evaluation tests of both modules in the 2nd opportunity** will be held on the date, time, and place of the official evaluation tests of the 2nd opportunity, which will be published on the official website of the Faculty of Marine Sciences (http://mar.uvigo.es/alumnado/examenes/). Students who take the continuous assessment may take the 2nd opportunity only for the failed module, and the mark of the approved module, practices and seminars will be kept.

Global evaluation option:

The application for this evaluation option will have to be submitted in the time and form determined by the Center, which will be published prior to the academic start. Given the experimental nature of the practicals, attendance is mandatory in order to be eligible for this evaluation option.

The evaluation tests (exams and problem solving) will be held on the date, time and place of the official evaluation tests, which will be published on the official website of the Faculty of Marine Sciences (http://mar.uvigo.es/alumnado/examenes/). The evaluation tests of both modules in the 2nd opportunity will be held on the date, time and place of the official evaluation tests of the 2nd opportunity, which will be published on the official website of the Faculty of Marine Sciences (http://mar.uvigo.es/alumnado/examenes/). Students who opt for a global evaluation may also take the 2nd opportunity only to the failed module, and the mark of the approved module will be kept. Failure to attend the practicals without a justified cause invalidates this possibility, as well as the opportunity for extraordinary evaluation (2nd opportunity).

Students taking this course are required to behave responsibly and honestly. Any form of fraud (copying or plagiarism) aimed at falsifying the level of knowledge and skills achieved in any kind of test, report or work is considered unacceptable. Fraudulent behavior may result in the suspension of the subject for an entire course. An internal record of these actions will be kept so that, in case of recurrence, a disciplinary file may be requested to be opened to the rector's office.

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 are recommended to be taken simultaneously

Aquaculture/V10G061V01310
Biological oceanography I/V10G061V01301
Biological oceanography II/V10G061V01306

Subjects that it is recommended to have taken before

Biology: Biology I/V10G061V01101
Biology: Biology 2/V10G061V01106
Marine botany/V10G061V01202
Marine zoology/V10G061V01210

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.