



IDENTIFYING DATA

Principles of marine microbiology

Subject	Principles of marine microbiology			
Code	V10G060V01404			
Study programme	(*)Grao en Ciencias do Mar			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	2nd
Teaching language	Spanish			
Department				
Coordinator	Longo González, Elisa			
Lecturers	Longo González, Elisa			
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Web				
General description	Basic introduction to marine microorganisms and their place in the living world. We study the used methods in marine microbiology, especially those based on molecular biology . The subyet explores the major metabolic pathways by which microbes obtain energy and carbon for celular growth, with especial attention to physiology and diversity of bacteria and arqueas. Their role in diverse hábitats and in ocean processes are included			

Competencies

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
A4	Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences
C11	To manage the use of littoral and coastal region and their resources in a sustainable way
C12	To be able to operate the instrumental techniques applied to sea
C13	To acquire, evaluate, process and interpret oceanographic data within the theories currently in use
C17	Ability to survey in the field and to work in the laboratory responsibly and safely, encouraging team work
C20	To find and evaluate marine resources of various kinds
D1	Analysis and synthesis ability
D2	Organization and planning skills
D6	Problem management and solving skills

Learning outcomes

Expected results from this subject	Training and Learning Results		
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. Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences	A2		
Organization and planning skills	A3		
To find and evaluate marine resources of various kinds	A4		
Ability to survey in the field and to work in the laboratory responsibly and safely, encouraging team work			
To be able to operate the instrumental techniques applied to sea	A2	C12 C13 C17 C20	D1 D6

New	A2 A3 A4	C11 C20	D1
New	A2 A3 A4	C11 C20	D1 D2 D6

Contents

Topic	
Topic 1.- Estructure and funtion of procariote cell	Estructure and size of procariote cell
Topic 2.- Methods in Microbiology. Viable but not culturable cells.	Methods in culture cultured and non cultured cell
Topic 3.- Sampling methods and microbiological techniques	Determation of the size of microbial poblations and molecular techniques
Topic 4.- Microbial metabolism and physiological diversity. Distribution and diversity of marine bacteria	Phototrofism, organotrofism and litotrofism. bacteria of marine habitats
Topic 5.- Distribution and diversity of marine arqueas	Arqueas of marine habitats
Topic 6.-Biogeoquemical cicles.	Carbón, nitogen and other biogemical cicles
Topic 7.- Interaction of microorganisms and others organisms	Simbiosis, methabiosis and other relationships

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	30	30	60
Laboratory practical	17	8.16	25.16
Collaborative Learning	0.5	0	0.5
Seminars	1.5	0	1.5
Essay questions exam	0.6	27	27.6
Objective questions exam	0.9	20.6397	21.5397
Problem and/or exercise solving	0.6	10.2	10.8
Essay questions exam	0.3	0	0.3
Objective questions exam	0.3	0	0.3
Problem and/or exercise solving	0.3	0	0.3
Objective questions exam	0.5	0	0.5
Essay	1.5	0	1.5

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

Methodologies

	Description
Lecturing	<p>The practices following the protocols previously exposed platform topic (which the student has to take to the lab) will be mandatory. Will be a test in the laboratory, on the last day of practices, which counted 15% in the final grade of the course. Also the valuation shall take into account the skills and the student skills in the laboratory that can be up to 5% of the note.</p> <p>Content of the practices of the subject: Practice 1. Preparation of media Practice 2. Methods of growing of microorganisms and obtention of pure culture Practice 3. Bacterial count Practice 4.-study of ayeast grwth curve Practice 5-bioluminescent bacteria Practice 6.-bacterial identification Practice 7.-conservation of microorganisms</p>
Laboratory practical	It is Explained the fluorescence staining technique. The protocol is displayed in a video and preparations will be shown. We will discuss their use and application. At the end there will be a type test to assess students understanding. The note of the seminar will be maximum 4% of final note and only scored students attending.
Collaborative Learning	(*O profesor-a organiza, asesora e supervisa as actividades integradas de aprendizaxe colaborativo a desenvolver en grupos de tres ou catro alumnos-as. Ao final se avaliarán os resultados obtidos mediante unha proba escrita.

Seminars	Students will develop a brief compression in team and individual work on bacterial movement. Groups will be formed. After the group work and discussion a summary/group of no more than 1 page will be delivered to computer. The group will propose a test question. The evaluation will be about: teamwork; Exhibition spokesman; Contributions to the general discussion; Questions; Overview. This activity will only score students attending and the maximum score is 5% of the final grade
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Personalized assistance

Methodologies	Description
Laboratory practical	Students will be served in a personalized manner the hours of tutoring from the teacher, who is 10-13 h, Monday and Tuesday, attention individual provided that is not another priority activity. The student who wish, can go to personalized tutoring to solve doubts, mainly at the times indicated. To optimize time, it is necessary that the student contact the teacher in advance.
Seminars	Students will be served in a personalized manner the hours of tutoring from the teacher, who is 10-13 h, Monday and Tuesday, attention individual provided that is not another priority activity. The student who wish, can go to personalized tutoring to solve doubts, mainly at the times indicated. To optimize time, it is necessary that the student contact the teacher in advance
Lecturing	
Collaborative Learning	

Assessment

	Description	Qualification	Training and Learning Results		
Essay questions exam	(*)LECCIÓN MAXISTRAL. Unha segunda proba incluírá preguntas de desenvolvemento.	30	A2 A3 A4	C11	D1
Objective questions exam	(*)LECCIÓN MAXISTRAL. Os contidos teóricos expostos na aula durante o curso avalíaranse mediante tres tipos de probas, a realizar no exame final. A primeira proba incluírá preguntas obxectivas. Indícase na columna adxunta o peso desta e as seguintes probas, na nota final da materia	10	A2 A3 A4	C11 C12 C13 C20	D2
Problem and/or exercise solving	(*)LECCIÓN MAXISTRAL. A terceira proba consistirá na resolución de exercicios.	16	A2 A3		D1 D6
Essay questions exam	(*)PRÁCTICAS. A segunda proba incluírá preguntas de desenvolvemento.	10	A2 A3	C17	D2
Objective questions exam	(*)PRÁCTICAS. Os contidos tratados en laboratorio avalíaranse mediante tres tipos de probas, a realizar ao termo da semana de prácticas. A primeira proba incluírá preguntas obxectivas.	10	A2 A3	C12 C17 C20	D2
Problem and/or exercise solving	(*)PRÁCTICAS. A terceira proba incluírá resolución de problemas.	12	A2 A3		D6
Objective questions exam	(*)SEMINARIO I. Aprendizaxe Colaborativo. Os contidos traballados avalíaranse ao final do seminario mediante unha única proba de preguntas obxectivas.	6	A3 A4		D1 D2
Essay	(*)SEMINARIO II. Os contidos traballados avalíaranse mediante un traballo en grupo, a realizar durante o seminario.	6	A4		D1 D2

Other comments on the Evaluation

□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□

Sources of information

Basic Bibliography

MUNN, C.B., **Marine Microbiology : Ecology and Applications**, 2nd ed., Garland science, 2011
 Willey, J.M., Sherwood, L. M. & otros, **Prescott Microbiology.**, 10 th ed., McGraw-Hill Education, 2017

Complementary Bibliography

Madigan, M. Martinko, J. M., Bender, K. y otros, **Brock Biology of Microorganisms**, 14th ed, Pearson Education, 2015
 Johnson, T. R. & otros, **Laboratory Experiments in Microbiology.**, 11th ed, Pearson, 2016

Recommendations

Subjects that continue the syllabus

Marine microbiology and parasitology/V10G060V01906
