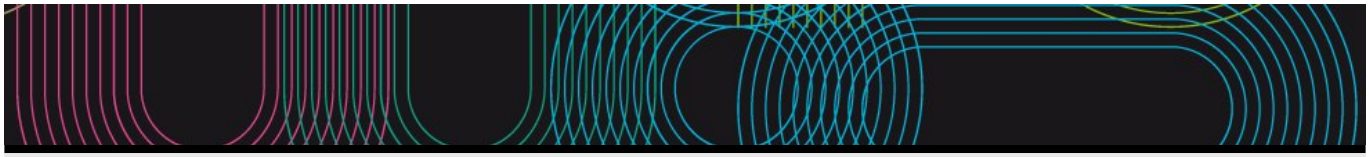

IDENTIFYING DATA				
(*)Xenómica Mariña				
Subject	(*)Xenómica Mariña			
Code	V02M098V01214			
Study programme	(*)Máster Universitario en Bioloxía Mariña			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd
Teaching language	Spanish			
Department	Biochemistry, Genetics and Immunology External			
Coordinator	Presa Martínez, Pablo Castro Tubio, José M.			
Lecturers	Castro Tubio, José M. Presa Martínez, Pablo			
E-mail	pressa@uvigo.es jmctubio@gmail.com			
Web	http://http://darwin.uvigo.es/mobgenomes/			
General description	During the last decade have been witnesses of an important development of the methodologies of *secuencación genomic, that has carried to an exponential increase of the knowledge of the eukaryotic genomes. These new technologies Are applying also to the knowledge of the genomes of the marine organisms. This *asignatura pretends to approach to the student to these technological advances, so that it purchase the knowledges and develop the necessary practical skills to confront with some autonomy to the new challenges of the genomics of the 21st century applied to the study of the half marine.			

Competencies	
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.
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
B6	Desarrollo de la curiosidad científica, de la iniciativa y la creatividad
C2	Conocimiento de la diversidad de organismos marinos y sus estrategias adaptativas
C4	Conocimiento y búsqueda del potencial interés económico y biotecnológico de los organismos marinos
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
D3	Desarrollo de las capacidades de trabajo en equipo, enriquecidas por la pluridisciplinariedad
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
Learn on the main components of a genome, and the novel ultrasequencing techniques for the study of the genomes of marine organisms.	A1 A2 A3 A5 B1 B2 B3 B6 C2 C4 C8 D1 D2 D3 D4 D5

Contents	
Topic	
Organization of marine genomes	Nuclear and mitocondrial genomes. Chromosomes, genes and repetitive elements. Karyotypes and sizes of marine genomes. Nucleotide and structural variants of a genome. Genetic databases.
Applications of NGS technologies to marine genomes analyses	New technologies of genome ultrasequencing. Modalities of genome and transcriptome sequencing. Sequencing strategies for the identification of genomic variation. Identification and analysis of genomic variants. Genome sequencing applications to the study of marine organisms.
De novo generation of reference genomes	Strategies for reference genome sequencing. Scaffolding and estimation of assembly quality (value of the N50 parameter). Construction of genomic maps from NGS data. Annotation of a reference genome. Estimation of the size of a genome using a k-mers counting approach. Projects and databases of marine reference genomes.
Applications of genomics to marine life	Biodiversity and biogeography. Adaptative evolution. Effects of anthropogenic-induced changes in marine habitat. Genome evolution. Aquaculture and bioprospecting

Planning			
	Class hours	Hours outside the classroom	Total hours
Lecturing	13	26	39
Classroom jobs	12	24	36
*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 professor explains the theoretical contents of each subject. They will supply wide diagrams of the matter and a specific bibliography so that the student can deepen in the distinct subjects. The student assimilates and annotates concepts. It poses doubts and questions.
Classroom jobs	Interactive sessions to integrate and apply the knowledges acquired in the master session.

Personalized attention	
Methodologies	**Description**
Lecturing	Real time attention to comprehension doubts.
Classroom jobs	Face-to-face guiding on analytical pathways.

Assessment			
	Description	Qualification	Training and Learning Results
Lecturing	Alumni will make a 10 minutes presentation on a scientific article related to the subject. Students' comprehension of the content of the scientific work presented will be assessed, as well as the communication capacity and the resources used in the exhibition.	80	A1 B1 C2 D2 A2 B3 C4 A5 B6 C8

Classroom jobs	Continuous evaluation: Assessment of the interest and competitiveness in the resolution of practical cases proposed by the professor	20	A1 A2 A3 A5	B1 B2 B3 B6	C8	D1 D2 D3 D4 D5

Other comments on the Evaluation

In the second call, the evaluation will be carried out through a final written test (short questions and / or test), which will be worth 80% of the total score. The grades obtained in the classroom works evaluated throughout the course, which will represent 20% of the total grade, will be maintained.

Sources of information

Basic Bibliography

Arthur M. Lesk, **Introduction to Genomics**, Tercera Edicción, Oxford University Press, 2017

T. A. Brown, **Genomes 4**, Cuarta Edicción, Garland Science, 2017

Complementary Bibliography

Recommendations

Subjects that it is recommended to have taken before

Genetic Diversity and its Application to Study of Marine Organisms/V02M098V01205

Other comments

The complementary bibliography will be proposed by the professor at the beginning of the course, and consists of a series of scientific articles that we will study.