
Ano Letivo 2019-20

Unidade Curricular GENÓMICA MARINHA

Cursos RECURSOS BIOLÓGICOS MARINHOS (2.º Ciclo) - ERASMUS MUNDUS
Tronco comum

Unidade Orgânica Faculdade de Ciências e Tecnologia

Código da Unidade Curricular 18361001

Área Científica

Sigla

Línguas de Aprendizagem Inglês/English

Modalidade de ensino A base teórica da disciplina é ensinada em sala de aula; a presença de estudantes é obrigatória

Docente Responsável Deborah Mary Power

DOCENTE	TIPO DE AULA	TURMAS	TOTAL HORAS DE CONTACTO (*)
Deborah Mary Power	T	T1; T2	4T
JOÃO CARLOS DOS REIS CARDOSO	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	6T; 6TP; 3S
Gareth Anthony Pearson	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	7T; 7TP; 2S
Bruno Emanuel Pereira Louro	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	4T; 4TP; 2S
Patrícia Isabel Silvestre Pinto	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	7T; 7TP; 2S

* Para turmas lecionadas conjuntamente, apenas é contabilizada a carga horária de uma delas.

ANO	PERÍODO DE FUNCIONAMENTO*	HORAS DE CONTACTO	HORAS TOTAIS DE TRABALHO	ECTS
1º	S1	12T; 10TP; 2S	84	3

* A-Anual;S-Semestral;Q-Quadrimestral;T-Trimestral

Precedências

Sem precedências

Conhecimentos Prévios recomendados

Ciência Biológicas
Disciplinas: Nenhum

Objetivos de aprendizagem (conhecimentos, aptidões e competências)

O aluno compreenderá os processos ecológicos e evolutivos que atuam n
O aluno compreenderá os princípios subjacentes das técnicas molecular
O aluno será capaz de fazer uma escolha ponderada sobre as técnicas m
O aluno irá adquirir o conhecimento para analisar e interpretar corre

Conteúdos programáticos

O curso é dividido em 3 módulos que descrevem o uso de abordagens gen
a) Genômica marinha e aplicação de dados de organismos marinhos (EST,
b) Expressão gênica e transcriptomas (+ projeto transcriptoma virtual
c) A aplicação do sequenciacao de DNA no estudo de comunidades microb

Demonstração da coerência dos conteúdos programáticos com os objetivos de aprendizagem da unidade curricular

O aluno adquirirá as capacidades necessárias para desenvolver uma est
O aluno desenvolverá a capacidade de analisar autonomamente conjuntos
O aluno será capaz de interpretar autonomamente resultados de análise

Metodologias de ensino (avaliação incluída)

O programa teórico será ensinado usando diversas ferramentas modernas. Os alunos serão incentivados a

Demonstração da coerência das metodologias de ensino com os objetivos de aprendizagem da unidade curricular

Um aspecto essencial dos cursos universitários é estimular o desenvolvimento do pensamento crítico e

Bibliografia principal

Bourlat S.J. [ed.]. Marine Genomics, Methods and protocols. Methods in Molecular Biology Series. Springer Protocols.

Bibliografia disponível no Web of Science (recomendado para cada docente dos 4 módulos).

Academic Year 2019-20

Course unit MARINE GENOMICS

Courses MARINE BIOLOGICAL RESOURCES (2nd Cycle) - ERASMUS MUNDUS
Tronco comum

Faculty / School FACULTY OF SCIENCES AND TECHNOLOGY

Main Scientific Area

Acronym

Language of instruction English

Teaching/Learning modality Blended learning (eg. part of the discipline is taught formally in a classroom setting, part is self-taught through guided Problem Based Learning).

Coordinating teacher Deborah Mary Power

Teaching staff	Type	Classes	Hours (*)
Deborah Mary Power	T	T1; T2	4T
JOÃO CARLOS DOS REIS CARDOSO	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	6T; 6TP; 3S
Gareth Anthony Pearson	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	7T; 7TP; 2S
Bruno Emanuel Pereira Louro	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	4T; 4TP; 2S
Patrícia Isabel Silvestre Pinto	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	7T; 7TP; 2S

* For classes taught jointly, it is only accounted the workload of one.

Contact hours

T	TP	PL	TC	S	E	OT	O	Total
12	10	0	0	2	0	0	0	84

T - Theoretical; TP - Theoretical and practical ; PL - Practical and laboratorial; TC - Field Work; S - Seminar; E - Training; OT - Tutorial; O - Other

Pre-requisites

no pre-requisites

Prior knowledge and skills

Biosciences

Specific Disciplines: None

The students intended learning outcomes (knowledge, skills and competences)

The student will understand the ecological and evolutionary processes acting at the genomic level in marine organisms.

The student will develop a good knowledge of the terminology used in the field of genomics applied to the marine biosphere.

The student will understand the underlying principles of the commonly used molecular techniques, including preservation of tissues and specimens.

The student will be able to make a considered choice about the most appropriate molecular techniques to address specific ecological or evolutionary questions.

The student will acquire the knowledge to correctly analyze and interpret molecular datasets from the individual to the community level.

Syllabus

The course is divided into 3 modules which outline the use of genomic approaches, from the ecosystem-level to the individual level. Theoretical aspects and techniques used will be demonstrated using examples and practical exercises.

a) Marine Genomics and application of data from marine organisms (EST, Gene Markers, Linkage maps, etc). Comparative genomics and genome evolution.

b) Gene expression and transcriptomes (+virtual transcriptome project), and the range of applications and questions that can be addressed in marine systems.

c) The application of DNA sequencing to the study of microbial communities in marine ecosystems or in particular tissues from marine organisms assessing community structure of marine ecosystems. Techniques discussed include amplicon sequencing, qPCR, metagenomics.

Demonstration of the syllabus coherence with the curricular unit's learning objectives

The student will acquire the necessary skills to design a fitting sampling strategy in the field of marine genomics directed toward hypothesis testing.

The student will develop the capacity to autonomously analyse molecular datasets ranging from gene sequences for phylogenetic, or population genetic studies, amplicon sequencing for meta-barcoding studies, and analyses transcriptomes for functional studies.

The student will be able to autonomously interpret results of molecular analyses and draw justified conclusions.

Teaching methodologies (including evaluation)

The theoretical program will be taught using diverse modern tools. Students will be encouraged to achieve the study objectives established for each of the themes presented. The theoretical program will take the form of traditional theoretical classes, and computer based PBL (problem based learning) classes will be used to stimulate discussion and exchange of ideas. Evaluation of the practical element of the discipline will be via a final computer based exam to assess the skills acquired in the area of the discipline (PE). The 3 modules that compose the discipline will each be evaluated during the term through PBL exercises. The final mark will be the average of the 3 marks obtained. Those that do not pass the continuous evaluation will be evaluated in an exam occurring after the end of the semestre. The evaluation by exam will cover all the material provided for the 3 modules.

Demonstration of the coherence between the teaching methodologies and the learning outcomes

An essential aspect of University courses is to stimulate the development of critical thinking and the capacity to solve complex problems rather than reinforce memorization of knowledge. The methodology adopted to teach Marine Genomics aims to stimulate the development of independent study methods and to develop a student's capacity to solve complex problems by providing a framework and strong background of essential fundamental knowledge about Marine Genomics. Questions for resolution in independent study will be used to stimulate student self-evaluation.

Main Bibliography

Bourlat S.J. [ed.]. Marine Genomics, Methods and protocols. Methods in Molecular Biology Series. Springer Protocols.

Specific bibliography will be provided by the professors responsible for each of the modules.