
Ano Letivo 2022-23

Unidade Curricular GENÓMICA MARINHA

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

BIOLOGIA MARINHA (2.º ciclo) (*)

(*) Curso onde a unidade curricular é opcional

Unidade Orgânica Faculdade de Ciências e Tecnologia

Código da Unidade Curricular 18361001

Área Científica CIÊNCIAS BIOLÓGICAS

Sigla CB

Código CNAEF (3 dígitos) 421

**Contributo para os Objetivos de
Desenvolvimento Sustentável - 13; 14
ODS (Indicar até 3 objetivos)**

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	2T
JOÃO CARLOS DOS REIS CARDOSO	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	8T; 6TP; 1S
Gareth Anthony Pearson	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	6T; 7TP; 1S
Patrícia Isabel Silvestre Pinto	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	8T; 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 no nível genômico em organismos marinhos. O aluno compreenderá os princípios subjacentes das técnicas moleculares comumente usadas, com grande ênfase na aplicação de ferramentas de bioinformática. O aluno será capaz de fazer uma escolha ponderada sobre as técnicas moleculares mais apropriadas para abordar questões ecológicas, evolutivas ou da biotecnologia azul. O aluno irá adquirir o conhecimento para analisar e interpretar corretamente conjuntos de dados moleculares do indivíduo para o nível da comunidade.

Conteúdos programáticos

O curso é dividido em 3 módulos que descrevem o uso de abordagens genômicas:

- a) Genômica marinha e aplicação de dados de organismos marinhos (EST, Genotyping-by-sequencing)
- b) Expressão gênica e transcriptomas (+ projeto transcriptoma virtual) e
- c) A aplicação do sequenciamento de DNA no estudo de comunidades microbianas

Metodologias de ensino (avaliação incluída)

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

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 2022-23

Course unit MARINE GENOMICS

Courses MARINE BIOLOGICAL RESOURCES (2nd Cycle) - ERASMUS MUNDUS
Common Branch

MARINE BIOLOGY (*)

Common Branch

(*) Optional course unit for this course

Faculty / School FACULTY OF SCIENCES AND TECHNOLOGY

Main Scientific Area

Acronym BC GB

CNAEF code (3 digits) 421

Contribution to Sustainable Development Goals - SGD 13; 14
(Designate up to 3 objectives)

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	2T
JOÃO CARLOS DOS REIS CARDOSO	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	8T; 6TP; 1S
Gareth Anthony Pearson	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	6T; 7TP; 1S
Patrícia Isabel Silvestre Pinto	S; T; TP	T1; T2; TP1; TP2; ;S1;; ;S2	8T; 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 develop a good knowledge of the terminology used in the field of genomics, metagenomics and transcriptomics applied to the marine biosphere.

The student will understand the underlying principles of the commonly used molecular techniques and bioinformatics tools that can be used to gain insight into large sequence datasets.

The student will be able to make a considered choice about the most appropriate molecular techniques and bioinformatics tools to address specific ecological, evolutionary or biotech related 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.

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. 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 in the 3 study areas. Those that do not pass the continuous evaluation will be evaluated in an exam occurring at the end of the semestre and the evaluation by exam will cover all the material provided for the 3 modules.

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.