UNIVERSITEIT GENT

Studiefiche

Academiejaar 2018-2019

Marine Genomics (C004045)

Cursusomvang (nominale waarden; effectieve waarden kunnen verschillen per opleiding)

Studiepunten	3.0	Studietijd	90 u	Contacturen	20.0 u

Aanbodsessies en werkvormen in academiejaar 2018-2019

A (semester 1)	Engels, Nederlands	hoorcollege	12.5 u
		werkcollege	5.0 u
		werkcollege: PC-klasoefeningen	12.5 u

Lesgevers in academiejaar 2018-2019

Derycke, Sofie	WE11	Verantwoordelijk lesgever
De Clerck, Olivier	WE11	Medelesgever

Aangeboden in onderstaande opleidingen in 2018-2019	stptn	aanbodsessie
Master of Science in Marine and Lacustrine Science and Management	3	A

Onderwijstalen

Nederlands, Engels

Trefwoorden

Biogeografische ditributiepatronen, dispersie, connectiviteit, fylogeografie, speciatie, diversiteit, cryptische soorten

Situering

The course deals with genome-enabled insights into the broader framework of environmental marine science. Topics within the course include evolutionary as well as functional aspects of genes, genomes and metagenomes of marine organisms from the individual to the ecosystem-level.
pre-requisites.
The course aims to provide students an introduction to the field of molecular ecology, specifically directed toward the marine environment on its organisms. The course is concerned with applying molecular population genetics, phylogenetics, as well as (meta-)genomics and (meta-)transcriptomics to traditional ecological and evolutionary questions (e.g., species diagnosis, conservation and assessment of biodiversity, quantitative genetics, heritability of traits and breeding studies, and questions of behavioral ecology).

Inhoud

The course is divided in modules which outline the use of genomic approaches, from the ecosystem-level, gradually narrowing to species-, population and individual -levels. Theoretical aspects and commonly used techniques will be demonstrated using examples and practical exercises from the marine environment.
a) Community-level addresses the use of genome data in assessing community structure of marine ecosystems. Techniques discussed include amplicon sequencing, qPCR, metagenomics (+ metatranscriptomics, metaproteomics, metabolomics).
b) Species-level offers an introduction to sequence alignment techniques, phylogenetics, species-delimitation, and phylogeography.
c) Population-level addresses the factors influencing population structure such as genetic drift, dispersal, mutation and selection. These aspects will be addressed using traditional organelle (mtDNA) and co-dominant markers (e.g. microsatellites) as well as NGS-based genome reduction techniques (Radseq, GBS). Aspects of speciation in the marine realm will be addressed also.
d) Individual-level: Heritability of physiological and morphological traits will be addressed using quantitative genetics, in combination with genome scans, QTL

analyses and RNA-seq.

Begincompetenties

Bachelor in sciences. Basic knowledge in ecology, evolution and genetics is highly recommended.

Eindcompetenties

1 The graduated student understands the ecological and evolutionary processes acting at the genomic level in populations of marine organisms.
2 The graduated student has a good knowledge of the terminology used in the field of molecular ecology.
3 The graduated students understands the underlying principles of the commonly used molecular techniques, including preservation of tissues and specimens.
4 The graduated student is able to make a considerate choice of molecular techniques to address specific ecologically or evolutionary questions.
5 The graduated student has acquired the knowledge to correctly analyse and interpret molecular datasets from the individual to the community level.

Creditcontractvoorwaarde

Toelating tot dit opleidingsonderdeel via creditcontract is mogelijk mits gunstige beoordeling van de competenties

Examencontractvoorwaarde

Dit opleidingsonderdeel kan niet via examencontract gevolgd worden

Didactische werkvormen

Hoorcollege, werkcollege, werkcollege: PC-klasoefeningen

Leermateriaal

PDF files of powerpoint presentations summarizing the oral lectures will be available through Minerva. Cost: 0 EUR

Referenties

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

Vakinhoudelijke studiebegeleiding

Opportunity for questioning the lecturers during the orals, and outside these via email, personal contact and in an electronic teaching environment.

Evaluatiemomenten

periodegebonden en niet-periodegebonden evaluatie

Evaluatievormen bij periodegebonden evaluatie in de eerste examenperiode

Schriftelijk examen

Evaluatievormen bij periodegebonden evaluatie in de tweede examenperiode

Schriftelijk examen

Evaluatievormen bij niet-periodegebonden evaluatie

Verslag

Tweede examenkans in geval van niet-periodegebonden evaluatie

Examen in de tweede examenperiode is enkel mogelijk in gewijzigde vorm

Eindscoreberekening

UGent: Exam 80%; Evaluation of presentation 20%