GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Marine Resources Genomics (C004232)

Course size *(nominal values; actual values may depend on programme)*

Credits 4.0 **Study time 100 h**

Course offerings in academic year 2026-2027

A (semester 2)	English	Gent

Lecturers in academic year 2026-2027

Estonba, Andone	LEIOA01	lecturer-in-charge
Alberdi, Antton	LEIOA01	co-lecturer
Montes, Iratxe	LEIOA01	co-lecturer
Zarraonaindia, Iratxe	LEIOA01	co-lecturer

Offered in the following programmes in 2026-2027	**crdts**	**offering**
International Master of Science in Marine Biological Resources	4	A

Teaching languages

English

Keywords

molluscs, crustaceans, fish, metabarcoding, metagenomics, population genetics

Position of the course

Molecular population genetics of marine animal and its applications in fisheries, marine farming, conservation management and ecosystem health protection. The course aims to initiate students into genomic research in the marine world by exploring current research cases, understanding of cutting-edge lab technologies, building bioinformatics/computational skills, and shaping knowledge base. At the end of the Unit, you should be able to apply population genomic approaches to survey patterns of variation within and among marine fish and shellfish populations and to apply metagenomic/metabarcoding approaches to study of complete communities directly in their natural environments.

Contents

1 Basics on Genomics.
2 Population genomics in non-model organisms.
3 Metabarcoding /Metagenomics.

Initial competences

Basis of bioscience or animal science and environmental sciences.

Final competences

1 Handle information Scope For Growth provides as regards to understanding actual growth and factors that may potentially affect growth rate.
2 Design simple experiments to measure the scope for growth in marine animals.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Seminar, Lecture

Extra information on the teaching methods

- Lectures 14
- Computer sessions 18
- Tutorials 8

Following completion of the course, each student will do an independent research work on genomics. There will be a Tutorial to identify a topic of interest. Raw sequence data coming from an experiment designed to meet a specific goal will be provided to each student.

Study material

None

References

A. POPULATION GENOMICS

- Stapley J et al. Adaptation genomics: the next generation. Trends in Ecology and Evolution (2010) Vol. 25, No. 12, 705-712
- Glenn TC. Field guide to next-generation DNA sequencers. Molecular Ecology Resources (2011) Vol. 11, No 5, 759–769
- Montes I, et al. 2013. SNP Discovery in European Anchovy (Engraulis encrasicolus, L) by High–Throughput Transcriptome and Genome Sequencing. PLoS ONE 8, e70051.
- Hemmer-Hansen J, et al. 2014. Population Genomics of Marine Fishes: Next-Generation Prospects and Challenges. Biol. Bull 227, 117–132.
- Montes I, et al. 2016a. No loss of genetic diversity in the exploited and recently collapsed population of Bay of Biscay anchovy (Engraulis encrasicolus, L.). Mar Biol 163(5), 98.
- Montes I, et al. 2016b. Transcriptome analysis deciphers evolutionary mechanisms underlying genetic differentiation between coastal and offshore anchovy populations in the Bay of Biscay. Mar Biol 163(10), 205.
- Martinez Barrio A, et al. 2016.. The genetic basis for ecological adaptation of the Atlantic herring revealed by genome sequencing. eLife 5, e12081.B.

METAGENOMICS

- Bohmann et al. Environmental DNA for wildlife biology and biodiversity monitoring. Trends in Ecology & Evolution (2014) Vol. 29, No. 6, 358-367
- Cristescu ME. From barcoding single individuals to metabarcoding biological communities: towards an integrative approach to the study of global biodiversity. Trends in Ecology & Evolution (2014) Vol. 29, No. 10, 566-571
- Pompanon et al. Who is eating what: diet assessment using next generation sequencing. Molecular Ecology (2012) 21, 1931–1950
- Jack A. Gilbert and Christopher L. Dupont Microbial Metagenomics: Beyond the Genome. Annu. Rev. Mar. Sci. 2011. 3:347–71 http://www.earthmicrobiome.org/
- Caporaso et al. Moving pictures of the human microbiome. Genome Biol. 2011; 12(5):R50.

Course content-related study coaching

Assessment moments

end-of-term assessment

Examination methods in case of periodic assessment during the first examination period

Assignment

Examination methods in case of periodic assessment during the second examination period

Assignment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Calculation of the examination mark

report (100%)