GHENT UNIVERSITY

Comparative Genomics (C002700)

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

Credits 3.0   **Study time** 80 h

Course offerings and teaching methods in academic year 2024-2025

| A (semester 2) | English | Gent | lecture |
| | | | seminar |

Lecturers in academic year 2024-2025

| Vandepoele, Klaas | WE09 | lecturer-in-charge |
| Li, Zhen | WE09 | co-lecturer |

Offered in the following programmes in 2024-2025	crdts	offering
Master of Science in Teaching in Science and Technology(main subject Biochemistry and Biotechnology)	3	A
Master of Science in Biochemistry and Biotechnology	3	A
Exchange programme in Biochemistry and Biotechnology (master's level)	3	A

Teaching languages

English

Keywords

Genomes, Evolution, Sequence analysis, Homology.

Position of the course

This course shows how basic bioinformatics techniques can be applied to solve complex biological questions regarding genome structure, gene regulation and evolution. This course gives an overview of some data resources publicly available for different eukaryotic species and demonstrates the application of different methods (e.g. sequence analysis, phylogenetic tree construction) to analyze the structure and evolution of genomes in more detail.This course also includes an introduction to comparative gene expression analysis.
This course contributes to the following program competences: Ma.WE.BB.1.2, Ma. WE.BB.1.3, Ma.WE.BB.2.5, Ma.WE.BB.2.6

Contents

- (Genome-wide) Sequence retrieval and resources for comparative genomics
- Homology, orthology & paralogy detection (BLAST, Multiple Sequence Alignments, protein clustering, phylogeny)
- Non-coding sequence evolution (local/global pairwise/multiple alignment tools, Conserved Noncoding Sequences, TFBS identification)
- Genome organization, evolution (colinearity, synteny) and phylogenetic dating of duplication events
- Comparative gene expression analysis
- Case studies

Initial competences

Basic knowledge genetics & molecular biology (genomes, genes, proteins, DNA, RNA, promoter). You succesfully followed a course Introduction to Bioinformatics.

Final competences

1 Application of basic comparative genomics techniques to retrieve and manipulate genomic sequence data.
2 Extracting computational research protocols from scientific publications.
3 Developing basic computational pipelines to answer specific biological questions

regarding gene/genome structure and evolution.

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

Study material

Type: Handouts

Name: Handouts
Indicative price: Free or paid by faculty
Optional: no
Language : English

Additional information: All information is available in the online free course material. Additional scientific publications are also shared.

References

Course content-related study coaching

In addition to the lectures the student can ask questions or additional information
(e-mail or personal appointment).

Assessment moments

end-of-term assessment

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

Written assessment with open-ended questions

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

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

Attendence practical sessions obliged.

Calculation of the examination mark

Written exam. Attendence to the practical sessions obliged.