GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Biological Databases (I002642)

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

Credits 5.0 **Study time 150 h**

Course offerings in academic year 2024-2025

A (semester 2)	English	Gent
B (semester 2)	English	Gent

Lecturers in academic year 2024-2025

Menschaert, Gerben	LA26	lecturer-in-charge
Van Criekinge, Wim	LA26	co-lecturer

Offered in the following programmes in 2024-2025	crdts	offering
Master of Science in Bioinformatics(main subject Bioscience Engineering)	3	B
Master of Science in Bioinformatics(main subject Systems Biology)	3	B
Master of Science in Bioscience Engineering: Cell and Gene Biotechnology	5	A
Exchange Programme in Bioinformatics (master's level)	3	B
Exchange Programme in Bioscience Engineering: Cell and Gene Biotechnology (master's level)	5	A

Teaching languages

English

Keywords

Biological databases, BioSQL, XML, Linux, PHP, networking, web-based application, hetergeneous data analysis and integration

Position of the course

The enhanced course on bioinformatics focuses on database design and implementation of biological datasets. Both string based data (sequence) and integer/real data as obtained by genome-wide experiments are integrated in different datamodels. It complements the (bio)informatics background by applying modern application development environments to (relational) database methodologies.

Contents

Remark: Part 3 (Computer infrastructure) is omitted for course offering B

1. Biological database management
1.1. The relational datamodel
1.2. Data normalisation
1.3. Structured query language
1.4. BioSQL/Chado: a biological datamodel
1.5. Object oriented databases
1.6. Biological databases
1.7. Biological database integration
1.8. Ditributed annotation systems (DAS)
1.9. Hierachical and frame-based system (XML, DAML+OIL)
2. Heterogeneous database integration
2.1. (Application) integration frameworks
2.2. Analysis methods: coupling large databases to statistics
2.3. Non relational data integration using LWP, Bots & Spiders
2.4. Text mining

2.5. Alternative query systems
3. Computer infrastructure *(only for course offering A)*
3.1. Basic computer architecture
3.2. Linux operating system (basic and advanced)
3.3. Packages and Biolinux
3.4. Networks (local, wan, protocols)
3.5. Hardware integration
3.6. High Performace Computer infrastructures
4. Ethical and sociological considerations regarding data storage and availability (to both the scientific community and patients themselves)

Initial competences

Basic knowledge of mathematics, computer science and bioinformatics.

Final competences

Being able to setup a propriatary database system, combining heterogeneous datasources and analyse/report in a web environment.

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, Independent work

Extra information on the teaching methods

Theory: oral lectures
Exercises: computer and paper exercises

Study material

None

References

On-line forum (http://www.bioinformatics.be)

Course content-related study coaching

On-line forum (http://www.bioinformatics.be)

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

Extra information on the examination methods

Assignment with oral presentation followed by discussion

Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.

Calculation of the examination mark