GHENT UNIVERSITY

# Course Specifications

Valid in the academic year 2018-2019

## Functional Plant Genomics (C003825)

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

| | | | |
|---|---|---|---|
| Credits | 3.0 | Study time | 80 h |
| Contact hrs | 25.0 h | | |

Course offerings and teaching methods in academic year 2018-2019

| | | | |
|---|---|---|---|
| A (semester 1) | English | lecture | 15.0 h |
| | | seminar: practical PC room classes | 10.0 h |

Lecturers in academic year 2018-2019

| | | |
|---|---|---|
| Vandepoele, Klaas | WE09 | lecturer-in-charge |
| De Veylder, Lieven | WE09 | co-lecturer |

| Offered in the following programmes in 2018-2019 | crdts | offering |
|---|---|---|
| Master of Science in Bioinformatics (main subject Systems Biology) | 3 | A |
| Master of Science in Biochemistry and Biotechnology | 3 | A |
| Master of Science in Plant Biotechnology | 3 | A |
| Exchange programme in Biochemistry and Biotechnology (master's level) | 3 | A |
| Exchange Programme in Bioinformatics (master's level) | 3 | A |

### Teaching languages

English

### Keywords

Transcriptome, proteome, interactome, plant resources and online databases.

### Position of the course

The course will provide insight in the use of system-wide technologies in plant science. The student will learn how –omics experiments are designed and how information is extracted from whole genome, transcriptome and proteome analysis. A substantial part of the contact hours will deal with offering the student hands-on experience with computational tools to access, analyse and visualize large data sets. Rather than a summing up of different technologies and their theoretical basis, the course aims to illustrate, largely based on case studies from the literature, what kind of knowledge a technology can deliver to the researcher.

### Contents

The course will deal with technologies at several levels of the biological system, as listed below. For each level we give examples of technologies or applications that will be covered.

1 Transcriptomics (microarrays, RNA-Seq, model system + *de novo*)
2 Gen function analysis using co-expression analysis
3 Mapping gene regulatory interactions (low + high-throughput methods)
4 Tools for plant protein profiling, localisation and interaction studies.
5 Molecular analysis of plants at the organ, tissue and cell level.
6 From mutant to gene (mutagenese, chemical genetics, mapping).

Seminars:

- Explore gene functions using online resources (PLAZA, CORNET, BAR)
- Detection of regulatory elements in plant promoters
- Case study

### Initial competences

Previous education in the life sciences equivalent with the level of Bachelor of Science in Biochemistry and Biotechnology. Specifically good knowledge of Molecular Genetics,

Molecular Plant Biology and Gene technology, including the basic technologies in Functional Genomics and Bioinformatics.

Final competences

1 The course will make the student acquainted with the methodology used in plant functional genomics at an advanced level, enabling her/him to apply these methods in research and to evaluate new applications.
2 The student knows and understands the principles, concepts and tools used in plant functional genomics studies. The student can tap into online databases to extract information relevant to understand the function of specific genes, proteins or metabolic pathways, and to formalize new hypotheses concerning the related biological processes.
3 S/He can critically evaluate research papers on the basis of presented data. These competences allow the student to start a research carrier in the field of plant biology.

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

Lecture, seminar: practical PC room classes

Extra information on the teaching methods

- classroom lectures.
- practical courses organized as guided workshops with internet access. Attendence to practical sessions is obliged.

Learning materials and price

All slide shows (ppt documents) and articles (pdf documents) referred to will be available online via Minerva.
No purchase of textbooks required.

References

All articles referred to during the lectures and practical courses will be indicated in powerpoint slides and will be available online via Minerva.

Course content-related study coaching

Lecturer’s emails and office hours will be provided upon request during lectures and via the course webpages.

Evaluation methods

end-of-term evaluation

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

Written examination

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

Written examination

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

Will be communicated to the students during the lectures and via Minerva.

Calculation of the examination mark

Will be communicated to the students during the lectures and via Minerva