GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

Functional Plant Biology (I002630)

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

Credits 4.0 **Study time 120 h**

Course offerings and teaching methods in academic year 2025-2026

A (semester 2)	English	Gent	peer teaching	0.0h
			lecture	0.0h
			independent work	0.0h

Lecturers in academic year 2025-2026

Geelen, Danny	LA21	lecturer-in-charge
Vanneste, Steffen	LA21	co-lecturer

Offered in the following programmes in 2025-2026	**crdts**	**offering**
Master of Science in Bioscience Engineering: Cell and Gene Biotechnology	4	A
Exchange Programme in Bioscience Engineering: Agricultural Sciences (master's level)	4	A
Exchange Programme in Bioscience Engineering: Cell and Gene Biotechnology (master's level)	4	A

Teaching languages

English

Keywords

Protein function, biochemical pathways, cell structure and function, gene expression, hormone signaling and process regulation, plant molecular biology, genetic engineering,

Position of the course

The course is a self study of plant gene/protein function. The student receives a blind DNA sequence as a starting point. With this sequence, the student will start a discovery journey that involves a bioinformatical analysis of the sequence followed by a molecular and physiological study to uncover its function. The student will be given a list of online tools that can be used to investigate the sequence. In addition, the student will read publications that provide experimental evidence on the function of the identified gene sequence. With this information the student will develop a concept or idea to use the sequence to control a plant molecular process that is important in the context of an agriculturally important plant trait such as flowering, seed formation, plant architecture and size, cell growth, and biomass production, stress resilience etc.. The self training course will provide insight into molecular aspects of plant specific processes that are relevant for growth and development and the plant's response to the changing environment and the occurrence of microbiota, pathogens and adverse climate conditions. By integrating knowledge on biochemistry, genetics, physiology, morphology etc, the student will learn about the quality and value of experimental data, computational data, and the relative importance of publications, type of journals publishing scientific papers.

Contents

The course begins with a detailed explanation how to start the journey, how to collect information and how to prepare a report on a specific gene/protein function. Most of the work is done by self study, however, there are frequent interactions when this is deemed necessary. An intermediate evaluation will be done to guide the student further in improving the research quest and to prepare a high quality report. The sequence will lead to reports on what is currently hot in plant biology and to address research questions that are important for improving agriculture.

Initial competences

Basis knowledge of plant biochemistry, plant physiology, plant genetics, and molecular biology

Final competences

1 read scientific publications and patents in the field of plant molecular biology
2 write a report on and present an overview of the function of a specific gene/protein.
3 identify the key factors of plant specific processes.
4 summarize scientific literature on a specific topic
5 explain how certain cellular processes have such important impact on plant growth, biomass production, stress resilience and ultimately plant yield
6 describe basic processes and physiological responses and developmental processes of a plant
7 know key genes are critically involved in plant development.
8 describe the relationship between the activity of genes, the environment and the phenotypic outcome
9 evaluate the presentation and report of fellow students
10 make ethical and professional decisions in the context of microteaching
11 have insight into the complexities of a problem by means of quantifiable methods and materials
12 Extract useful information out of a wealth of available information
13 Integrate technological, and biological aspects of research and research papers

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

Group work, Lecture, Independent work, Peer teaching

Extra information on the teaching methods

A powerpoint presentations will be made available through Ufora giving a detailed instruction on how to prepare a report and how to prepare a presentation.

Study material

None

References

Papers extracted from scientific journals in the field of plant molecular biology

Course content-related study coaching

Individual guidance is offered upon request

Assessment moments

end-of-term and continuous assessment

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

Oral assessment

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

Oral assessment

Examination methods in case of permanent assessment

Participation, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

Students are evaluated based on a written report, on a oral presentation of the report to fellow students, on the participation to a discussion after the presentation from fellow students. Students will participate in the evaluation of each other.

Calculation of the examination mark

Written report 70%, presentation 20%, participation to discussion 10%. Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.