

Course Specifications

From the academic year 2016-2017 up to and including the

Plant Developmental Biology (C003328)

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

Credits 5.0 Study time 150 h Contact hrs 46.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	English	practicum	15.0 h
		lecture	30.0 h

Lecturers in academic year 2018-2019

Beeckman, Tom	WE09	lecturer-in-charge
De Rybel, Bert	WE09	co-lecturer

Offered in the following programmes in 2018-2019

	crdts	offering
Master of Science in Biology	5	A
Exchange Programme in Biology (master's level)	5	A

Teaching languages

English

Keywords

Plant architecture, gametogenesis, double fertilization, seed development and endosperm development, life cycle phase changes, secondary growth, trichome development, miRNA mediated control on development, hormonal control on development, leaf and shoot development, root development.

Position of the course

This course is a continuation of and will further build on the part plant developmental biology of the general course Developmental biology of the 3rd Bachelor Biology. It will provide deeper insight into important terminology such as stem cells and pattern formation. The phase changes that occur during the life cycle (embryo to juvenile, juvenile to adult and adult to reproductive) will be discussed in detail highlighting the conserved molecular mechanisms that are involved. In addition it will introduce and elaborate on novel important trends in developmental biology such chromatin and miRNA mediated gene expression regulation and its consequences for developmental processes. Over the entire course references to plant evolution will be made because "evo-devo" aspects become more and more within reach due to the increasing number of organisms for which a genome sequence becomes available.

Contents

While the 3rd Bachelor course will be limited to an introduction to the field and will be restricted to two developmental aspects (embryogenesis and flower development), this course will included the other aspects in order to cover the entire plant life cycle from a developmental viewpoint. More specifically the course will consist of chapters on:

- Seed development
 - Gametophyte development
 - Endosperm development
 - Seedcoat development
 - Structural aspects of seed dormancy and germination
- Phase changes
 - definitions
 - molecular control of phase changes in Arabidopsis
 - molecular control of phase changes in Monocots
 - miRNA in phase changes
- Vegetative Architecture

- Leaf and shoot development
 - Branching of the stem: axillary meristems, hormones and genetic control
 - Root development
 - Branching of the root: cell cycle status of the pericycle, polar auxin transport, oscillatory gene expression, asymmetric cell division
- Secondary growth
 - The vascular cambium
 - Molecular components of cambial activity
 - Wood structure
 - Pattern formation in the epidermis
 - Stomata development
 - Trichome and root hair development

Initial competences

Students should have a thorough knowledge of plant anatomy and morphology. Furthermore, a basic knowledge of plant development, molecular biology and genetics is required.

Final competences

- 1 Students will obtain insight in developmental aspects of the entire life cycle of plants.
- 2 They will become familiar with the complexity of developmental processes and will understand the importance of interdisciplinary research as necessity to answer developmental research questions.

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, practicum

Learning materials and price

Syllabus: available through Minerva

Textbooks:

- Biochemistry & Molecular Biology of Plants. Bob Buchanan, Wilhelm Gruissem, Russell Jones (Editors), 2002, Wiley-Blackwell, 1408 pp., ISBN: 978-0-943088-39-6. The Molecular Life of Plants
- Russell Jones, Helen Ougham, Howard Thomas, Susan Waaland (Editors), 2012, 766 pp., Wiley-Blackwell, ISBN 978-0-470-87011-2.

References

Course content-related study coaching

Opportunity to ask questions through email and to discuss outside the contact hours by appointment.

Evaluation methods

end-of-term evaluation and continuous assessment

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

Participation

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

Periodic evaluation: Written examination with oral feedback

Permanent evaluation: Participation in lectures and practical

Calculation of the examination mark

Permanent evaluations count for 1/5 of the total score (same calculation for first and second examination period)