M4439	M4439 - Integrative Topics in Plant Science
	Integrative Topics in Plant Science

Coordinator (responsible lecturer) Prof. Dr. Andreas Weber (andreas.weber@uni-duesseldorf.de)			**Status:** 04.02.2019
Lecturers Prof. Dr. Feldbrügge, Dr. Göhre, Prof. Dr. Groth, Prof. Dr. Jahns, Prof. Dr. Lercher, Dr. Linka, Dr. Matsubara, Prof. Dr. Pauly, Prof. Dr. Rose, Prof. Dr. Bauer, Prof. Dr. Simon, Prof. Dr. Weber, Prof. Dr. Zeier, Prof. Dr. Zurbriggen			**Semester:** 1.- 2.
Contact and organization Dr. Fackendahl (Petra.Fackendahl@uni-duesseldorf.de)			**Mode:** optional compulsory course
Workload 420 h	**Credit points** 14 CP	**Contact time** 225 h	**Self-study** 195 h
Course components Practical course: 18 SWS Lectures: 2 SWS	**Frequency** every winter-term	**Group size** 16	**Duration** 1 semester

Learning outcomes/skills

Students have learned the concepts and methods of modern plant science and are capable of using them. They have adopted genetic, molecular biological and biochemical techniques and can apply these techniques independently. Students are familiar with the major scientific equipment and are capable of using the instruments precisely and independently.

Forms of teaching

Lectures, practicals

Content

Lectures:

Plant-pathogen interaction:

The plant immune system; Polar growth in phytopathogens; Systemic acquired resistance in plants; Molecular evolution of a disease resistance pathway

Plant genomes, gene regulation and development

Comparative genomics and transcriptomics; Plant epigenetics – inheritance beyond the DNA sequence; The stem cell concept in plant development; Plant membrane proteins: Molecular motors, sensors and transmitters; Transcription factor networks involved in the regulation of metal uptake; Synthetic Biology – controlling and understanding of eukaryotic signaling processes and regulatory networks; Structure and function of the plant cell wall and it's use as renewable resource

Photosynthesis and plant metabolism

C4 photosynthesis – physiology, developmental biology and evolution; Photo-oxidative stress in plants; Carotenoids in plant stress response; Players, metabolic interactions and evolution of the photorespiratory pathway; Intracellular metabolite transport in plant cells; Peroxisome – a neglected, but important organelle for plant function

Practical course:

The practical course will cover modern methods in molecular biology: e.g. DNA – and RNA

isolation methods, fluorescence microscopy, gel-electrophoresis, PCR; *and biochemistry:* e.g. immuno-localisation and purification of proteins, analysis of enzyme kinetics and regulatory properties of proteins.
The practical course will consist of research projects in the laboratories of the participating lecturers. The laboratory can be chosen according to the student's interest. The methods to be learned will depend on the research project.

Eligibility
Formal: Admission to Master program
Content-related: Students must be familiar with elementary molecular biological and bio chemical techniques and the basics of gene regulation and signaltransduction.

Examination types
Learning portfolio consisting of:
(1) Knowledge base (70 % of final grade): written examination on the contents of lectures and the background of practicals
(2) Documentation (30 % of final grade): report (analysis and discussion of the experiments)

Requirements for the award of credit points for this course
(1) Passing the knowledge test
(2) Participating regularly and actively in the practical course
(3) Delivering a report that meets the minimum standards of scientific documentation

Relevant for following study programs/major
M.Sc. Biologie
Major:
Synthetic Biology and Biotechnology
Molecular Ecology and Evolution
Physiology and Development
Structural Biology

Compatibility with other curricula
M. Sc. Biochemie

Significance of the mark for the overall grade
The mark given will contribute to the final grade in proper relation to its credits.
M.Sc. Biologie 14/72 CP (2-years program)

Course language
German
English
German and English
German, English on demand

Additional information

Enrolling into the module is granted by the central study office of the Department of Biology.
http://www.biologie.hhu.de/en/studies-in-biology/students-info/central-allocation-of-modules.html

From summer semester 2019 students can only choose one "Integrative Topics in …." module.