

<b>M4439</b>		<b>Integrative Topics in Plant Science</b>		
<b>Coordinator</b> Prof. Dr. Andreas Weber (andreas.weber@uni-duesseldorf.de)				
<b>Lecturers</b> 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				
<b>Contact and organization</b> Dr. Fackendahl (Petra.Fackendahl@uni-duesseldorf.de)				
<b>Work load</b> 270 h	<b>Credit points</b> 14 CP	<b>Contact time</b> 300 h	<b>Self-study</b> 120	<b>Duration</b> 1 semester
<b>Course components</b> Practicals: 18 SWS Lectures: 2 SWS		<b>Frequency</b> Winter Semester		<b>Group size</b> 16 students
<b>Learning outcomes/skills</b> 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.				
<b>Forms of teaching</b> Lectures, practicals				
<b>Contents</b> <i>Lectures:</i> <b>Plant-pathogen interaction:</b> The plant immune system; Polar growth in phytopathogens; Systemic acquired resistance in plants; Molecular evolution of a disease resistance pathway  <b>Plant genomes, gene regulation and development</b> 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  <b>Photosynthesis and plant metabolism</b> 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  <i>Practical course:</i> <i>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.</i>				

<p>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.</p>
<p><b>Requirements for admission</b>  <b>Formal:</b> None;  <b>With regards to content:</b> Students must be familiar with elementary molecular biological and biochemical techniques and the basics of gene regulation and signal transduction.</p>
<p><b>Type of examination</b>  (1) Knowledge base (80 % of final grade): written examination on the contents of lectures and the background of practicals  (2) Documentation (20 % of final grade): report (analysis and discussion of the experiments)</p>
<p><b>Requisites for the allocation of credit</b>  (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</p>
<p><b>Relevant for following study programmes/major (only MSc programme)</b>  MSc programme in biology; International MSc programme in biology;  Major: "Microbiology/Biotechnology", "Evolution/Genetics"</p>
<p><b>Compatibility with other curricula</b>  MSc programme in biochemistry</p>
<p><b>Significance of the mark for the overall grade</b>  The mark given will contribute to the final grade in proper relation to its credits.</p>
<p><b>Course language</b>  English</p>
<p><b>Additional information</b>  Enrolling into the module is granted by the central study office of the Department of Biology.</p>