Plant Genetics and Development					
Identification number	Workload	Credit points	Term of studying	Frequency of occurence	Duration
MN-B-SM (PD 1)	360 h	12 CP	1st or 2nd term of studying	Summer term, 1st half	7 weeks

1	Type of lessons	Contact times	Self-study times	Intended group size
	a) Lectures	9 h	18 h	max. 3
	b) Practical/Lab	166 h	140 h	max. 1
	c) Seminar	3 h	24 h	max. 1

2 Aims of the module and acquired skills

Students who successfully completed this module …

- have acquired detailed knowledge on principles and methods used to study plant development including genetics, molecular biology next generation sequencing and microscopy.
- have obtained an understanding of different aspects of plant development including leaf development, root development, flowering, flower development and stamen development.
- are able to independently plan, carry out and evaluate small scientific projects related to the topics of the module.
- have learned how to present research results in oral and written form and to critically discuss scientific publications related to the topic of the module on a professional level.
- are able to transfer skills acquired in this module to other fields of biology.

3 Contents of the module

- Genetic and phenotypic characterization of mutants
- Expression studies
- Linkage mapping
- Generation and characterization of transgenic plants
- Next generation sequencing appoaches
- CRISPR/Cas9 gene editing
- Micro RNAs
- Microscopy

Explanatory note: The above list comprises state-of-the art genetic and molecular techniques that are commonly used in the field of plant genetics and plant molecular biology. Every student participating in this module will be confronted with a large subset of it. The exact content, however, will depend on the 6-week research project the student will work on (lab of Prof. Dr. M. Tsiantis: leaf development and diversity; lab of Dr. A. Hay: flower development and seed dispersal; lab of Dr. I. Acosta: stamen development; lab of Dr. T. Grube Andersen: root development; lab of Jun.-Prof. Dr. M. Albani: perennial flowering).

4 Teaching/Learning methods

- Lectures; Practical/Lab (Project work); Seminar; Guidance to independent research; Training on presentation techniques in oral and written form

5	Requirements for participation Enrollment in the Master´s degree course “Biological Sciences”
6	Type of module examinations The final examination consists of three parts: 30 min oral examination about topics of the lectures and the practical/lab part (50 % of the total module mark), oral presentation (25 % of the total module mark) and seminar paper (25 % of the total module mark)
7	Requisites for the allocation of credits Regular and active participation; Each examination part at least “sufficient” (see appendix of the examination regulations for details)
8	Compatibility with other Curricula None
9	Significance of the module mark for the overall grade 15 % of the overall grade (see also appendix of the examination regulations)
10	Module coordinator Dr. Angela Hay, phone 5062-108, e-mail: hay@mpipz.mpg.de
11	Additional information Subject module of the Master´s degree course “Biological Sciences”, Focus of research: (P) Molecular Plant Sciences; (D) Developmental Biology Participating faculty: Dr. I. Acosta, Prof. Dr. M. Albani, Dr. T. Grube Andersen, Dr. A. Hay, Prof. Dr. M. Tsiantis Location: The module will be held at the MPI for Plant Breeding Research, Carl-von-Linné-Weg 10, 50829 Köln Literature: • Griffiths, A.J.F., Wessler, F.R., Lewontin, R.C., *et al.* (2008) An Introduction to Genetic Analysis. 9th edition, W.H. Freeman • Leyser, O., Day, S. (2003) Mechanisms in Plant Development. Blackwell Publishing • Taiz, L., Zeiger, E. (2010) Plant Physiology. 5th edition, Palgrave Macmillan. Chapter 25, pp 719-753 • Sun et al. (2015) Plant Functional Genomics, Series: Methods in Molecular Biology, Chapter 19, 381-395. http://link.springer.com/protocol/10.1007%2F978-1-4939-2444-8_19. General time schedule: Week 1-6 (Mon.-Fri.): Lectures, practical/lab and preparation for the seminar talk (topic and date will be arranged individually) as well as writing seminar paper; Week 7 (Mon.-Fri): Preparation for the oral examination Note: The module contains hand-on laboratory work conducted individually and is taught in research laboratories. The module does not contain computer-based practicals/research as a main component. Introduction to the module: April 02, 2020 at 2:00 p.m., MPI for Plant Breeding Research, Carl-von-Linné-Weg 10, 50829 Köln, Seminar room 2 Oral examination: May 22, 2020, second/supplementary examination July 31, 2020; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.