**Module Name**
Plant Genetics

| **Type of Module** | **Module Code** |
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| o Advanced Module | Plant Genetics |

| **Identification Number** | **Workload** | **Credit Points** | **Term** | **Offered Every** | **Start** | **Duration** |
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| MN-B-SM (P 1) | 360 h | 12 CP | 2nd term of studying | Summer term | summer term only | 7 weeks |

| 1 | **Course Types** | **Contact Time** | **Private Study** | **Planned Group Size** |
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| | a) Lectures | 20 h | 30 h | max. 12 |
| | b) Tutorials | 14 h | 14 h | max. 12 |
| | c) Practical/Lab | 144 h | 109 h | max. 6 |
| | d) Seminar | 5 h | 24 h | max. 4 |

**2 Module Objectives and Skills to be Acquired**

Students who successfully completed this module

- have gained in-depth knowledge in up-to-date plant research topics. As this module also includes a section on molecular plant breeding which is co-taught by a plant breeder from a commercial breeding company, students will also gain transferable knowledge.
- are trained in modern techniques in advanced molecular biology, biochemistry and cell biology (see contents of the module).
- can independently carry out small scientific projects related to the topic 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 Module Content**

- Theory of modern methods in molecular plant sciences (also used in other sciences)
- Plant developmental biology
- Molecular biology of plant-environment interactions
- Biotic interactions (e.g. symbiosis with mycorrhizal fungi)
- Protein-protein interactions (e.g. co-immunoprecipitations, FRET, co-localization)
- Genetic and molecular analysis of cell-cell communication (mutant analysis, plant transformation)
- Cell imaging using fluorescent and confocal microscopy
- Analysis of reporter gene activities, particle bombardment
- Real-time RT-qPCR to analyze gene expression
- Epigenetics, histone modifications
- Other methods in modern molecular biology, biochemistry and cell biology
- Learning how to write a grant proposal

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| **4** | **Teaching Methods**<br>Lectures; Interactive tutorials; Practical/Lab; Seminar; Guidance to independent research; Training on writing and presentation techniques in oral and written forms |
| **5** | **Prerequisites (for the Module)**<br>Enrollment in the Master´s degree course “Biological Sciences”<br>**Additional academic requirements**<br>Previous attendance of the lecture module “Molecular Plant and Microbial Sciences (P)”. |
| **6** | **Type of Examination**<br>The final examination consists of two parts: written examination on topics of lectures, seminars and the practical/lab part (1 hour; 50 % of the total module mark), oral presentation (20-30 min; 50 % of the total module mark) |
| **7** | **Credits Awarded**<br>Regular and active participation;<br>Each examination part at least “sufficient” (see appendix of the examination regulations for details) |
| **8** | **Compatibility with other Curricula**<br>None |
| **9** | **Proportion of Final Grade**<br>15 % of the overall grade (see also appendix of the examination regulations) |
| **10** | **Module Coordinator**<br>Prof. Dr. Ute Höcker, phone 470-6897, e-mail: hoeckeru@uni-koeln.de |

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| **11** | **Further Information**<br><br>**Subject module** of the Master´s degree course “Biological Sciences”,<br>**Specialization:** (P) Molecular Plant and Microbial Sciences<br><br>**Participating faculty**: Prof. Dr. M. Bucher, Prof. Dr. U. Höcker, Prof. Dr. M. Hülskamp, Dr. F. Turck<br><br>**Literature:** Information about textbooks and other reading material will be given on the ILIAS representation of the course (https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html)<br><br>**General time schedule:** Week 1-5 (Mon.- Thu/Fri.): Lectures, tutorials, practical/lab and writing exercises. Week 6 (Mon.-Fri): Preparation for the seminar talk (held at the end of week 6); Week 7 (Mon.-Fri): Preparation for the written examination<br><br>**Note:** The module contains hands-on laboratory work conducted in groups of max. two people and is taught in a course room fully equipped with up to date research technology. The module does contain computer-based practicals/research as one main component.<br><br>**Introduction to the module:** Mon, April 04, 2022 at 8:45 a.m., Cologne Biocenter, room 4.004 (fourth floor) or online (in this case, further information/link will be sent to your Smail-Account); for preparation to the module before this introduction see ILIAS link under literature.<br><br>**Written examination:** May 20, 2022, second/supplementary examination August 05, 2022; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module. |