Excerpt from Module Descriptions

Master of Science Biochemistry

Examination Regulations in the Version of: 2015

Sub-Section: Biology
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Biology

Molecular Biosciences
Molecular Biosciences
Modules referring to Biology

Code 8802570552

ECTS credits 5

Attendance time 4

Language of instruction English

Duration 1 Semester

Cycle each Winter Semester

Coordinator Prof. Dr. Anita Marchfelder

Instructor(s) apl. Prof. Dr. Stefan Binder, Prof. Dr. Anita Marchfelder, Dr. Frank Bengelsdorf

Allocation of study programmes Biochemistry MSc, start of studies: winter semester, compulsory module, 1st study semester;

Biology MSc, start of studies: winter semester, compulsory module, 1st study semester

Recommended prerequisites Formally: Refer to the subject-specific examination regulations of the respective study course, in the version that is effective when taking up the study program.

Contentually: None.

Learning objectives Students who have successfully completed this module

• have an in-depth knowledge about important aspects of modern plant molecular biology and plant biotechnology, as well as biotechnology of prokaryotes.
• have solid knowledge about the most important basic techniques of general molecular and plant molecular biology and their use to elucidate complex processes in a living cell.
• are capable to assess the limits of molecular approaches in botany and microbiology with the help of examples.
• possess expertise to judge and deliberate applied developments in green and white gene technology, on a scientific up-to-date level, concerning the practical relevance and its benefit and risk, respectively.

Syllabus This module covers the following subject-specific topics:

Lecture Molecular Bioscience / Molecular biology and gene technology of plants:
• Modern aspects of plant molecular biology and plant biotechnology including important techniques for molecular biology research in plants. Special focus is on plant specific techniques like plant transformation and approaches to identify plant genes and their functions.
• Current examples from applied plant biotechnology.

Lecture Molecular Bioscience / Microbiology:

• DNA transfer in bacteria: transformation, transduction, conjugation
• structure and construction of plasmids and vectors, transfer of recombinant DNA in bacteria, verification of genetically modified organisms
• „blotting-methods“ for detection of DNA, RNA and proteins
• detection of recombinant proteins using SDS-PAGE and „Western-Blot“
• Sequencing of nucleic acids and data management, methods of sanger sequencing, 454-pyro sequencing, Illumina sequencing, PacBio sequencing, and nanopore sequencing
• introducing of the data bank systems such as NCBI and EBI, as well as the analysis of DNA sequences: sequence alignments, reconstruction of phylogenetic trees, bacterial genome sequences, metagenomes and metatranscriptomes of environmental samples

Literature

Lecture Molecular Bioscience / Molecular biology and gene technology of plants:
• Heldt: Pflanzenbiochemie, 3. Auflage, Spektrum Verlag
• Schopfer/Brennicke: Pflanzenphysiologie, 7. Auflage , Spektrum Verlag
• Buchanan et al.: Biochemistry and Molecular Biology of Plants, American Society of Plant Physiologists

Lecture Molecular Bioscience / Microbiology:
• lecturers provide chalkboard writing, mention relevant data bases
• Clark und Held: Molecular Biology: Das Original mit Übersetzungshilfen: Understanding the Genetic Revolution (SAV Biowissenschaften), Auflage: 1, Spektrum Verlag;
• Pevsner, J: Bioinformatics and Functional Genomics (Englisch), Auflage: 2, John Wiley & Sons

Teaching and learning methods

• Molecular Bioscience / Molecular biology and gene technology of plants (lecture), 3 credit hours [SWS], 3 credit points [LP]
• Molecular Bioscience / Microbiology (lecture), 1 credit hour [SWS], 2 credit points [LP]

Workload

Attendance: 60 h
Private study: 90 h
Sum: 150 h

Assessment

The grade of the module will be the grade of the written exam. No prerequisites are necessary for exam registration.

Grading procedure

The grade of the module will be the grade of the exam.
### Basis for

| Modules Molecular Botany [Molekulare Botanik], Microbiology (Master) [Mikrobiologie (Master)], Endocrinology [Endokrinologie], Genetics [Genetik] |  |