Title of the module	**Functional genomics of bacteria: RNA and microarray analysis**
Term/semester	Summer term / 2
VAK-Number	Will be assigned centrally
Credit points	6 ECTS
Compulsory/ elective course	Elective course
Teaching methods	Method: Lecture; Seminar; Practical course SWS: 1 (14 h); 2 (28 h); 4 (56 h) CP: 1.5; 2.5; 2
Self study	protocols 20 h preparation of the talk 30 h learning for the exam 32 h
Module representative	Prof. B. Reinhold-Hurek
Instructor	Dr. T. Hurek, Prof. B. Reinhold-Hurek
Examiner	Dr. T. Hurek, Prof. B. Reinhold-Hurek
Objectives	Increase theoretical knowledge on plant-microbe interactions and their molecular mechanisms. Increase knowledge on methods of functional genomics and gene expression studies. Increase skills in application and optimization of molecular biological methods such as PCR-based techniques, microarrays, and analysis of bacterial mRNA.
Content of teaching	The course is research-oriented, each student will work on his own experimental set. Molecular principles of plant-microbe interactions, microarray and PCR applications, and RNA analysis will be covered theoretically. *Experiments include:* • Gnotobiotic cultivation systems: Inoculation experiments of rice under aseptic conditions (Controlling of bacterial growth, aseptic handling of seedlings). • Optimization of reaction conditions for PCR (effect of variation of different parameters). • Real-time PCR experiments for quantification • Competition experiments for bacterial mutants after site-directed mutagenesis (DNA extraction from roots, PCR) • Oligonucleotide-based microarray experiments including controls (Generation of fluorescent target, electroelution from agarose gels, strand separation, hybridization, scanning and statistical evaluation)
Educational objectives	• Ability to deeply understand the topics above • Ability to design and to carry out above-mentioned experimental strategies with appropriate controls.
Evaluation of learning progress	Seminars and protocols
Assessment	Seminar talk (30%); protocol (20%); oral examination (50%)
Frequency	Every summer term
Usage in other degree programmes	The module is suitable for all master students in the BMB-program, eligible for the specialization “Microbial Systems” and also suitable for diploma students.
Requirements	Successful attendance in modules A and B