Techniques in Biomedicine

Module Code	Workload	Credits	Semester	Frequency of Module	Duration
	180 hrs.	6	1	Each semester	1 Semester

1	Module Components	Teaching Language	Contact Hours	Self Study	Class Size
	a) Diagnostics of Microorganisms	a) English	a) 22,5 hrs.	a) 67,5 hrs.	a) 15
	b) Model Systems	b) English	b) 22,5 hrs.	b) 67,5 hrs.	b) 15

2 Learning Outcomes

After successful participation in the module the students ...

Comprehension (2)
... get knowledge of different model systems, their advantages, disadvantages and limits in research, medicine and testing.
... explain the advantages and disadvantages of a variety of state-of-the-art techniques used in the diagnostics of microorganisms.

Application (3)
... plan experiments or tests with appropriate model organisms answering specific questions.
... choose appropriate diagnostic methods for a given research question in microbiology.

Evaluation (6)
... evaluate the strength and weaknesses of published studies with respect to the methods used.

3 Individual Component Content

a) overview on the variety of state-of-the-art-methods to isolate, quantify and identify microorganisms and their physiological properties from medically important samples, e.g., aerobic and anaerobic cultivation techniques, PCR, qPCR, molecular fingerprinting techniques, FACS, FISH, MALDI-TOF, FT-IR spectroscopy, NGS, SIP, Metatechnologies etc.

b) overview on different types of frequently used models systems, e.g. mice, zebrafish, drosophila, stem cells, yeast, as well as new developed methods (bioengineering) and rare used models; discussion on limits by law, ethics and comparability to humans.

4 Teaching Methods

a) Seminar

b) Seminar

5	**Prerequisites** B.Sc.-level based-knowledge in (human) biology, molecular biology, biochemistry and (clinical) microbiology
6	**Methods of Assessment** a) Graded Assessment 1sbR (Review) (3 LP) b) Graded Assessment 1sbPN (Presentation) (3 LP)
7	**Applicability of Module** Precision Medicine Diagnostics M.Sc. (PMD)
8	**Person Responsible for Module** Prof. Dr. Markus Egert (Module Responsible)
9	**Reading List (Core Texts and Recommended Texts)** a) textbooks on Microbiology; scientific papers (review, original articles) dealing with the respective methods b) scientific papers (review, original articles) dealing with model organisms; textbooks on cell culture, bioengeneering, animal models; legal texts (TierSchG, TierSchVerV, ESchG)