module code / module title

Module D-PFT/ Plant and fungal transformation as tool for functional analysis and *in vivo* visualization

date / version of the module description	12.01.2020

1	**INFORMATION ON THE MODULE**	
1a	module code	Module D-PFT
1b	module title *(German title)*	Klicken Sie hier, um Text einzugeben.
1c	module title *(English title)*	Plant and fungal transformation as tool for functional analysis and *in vivo* visualization
1d	credit points	6
1e	responsible for the module	Prof. Dr. Uwe Nehls
1f	type of module	elective module
1g	programs using the module	M.Sc. Biochemistry and Molecular Biology, (elective module for students in Integrative BMB, elective component for students in MicroSys specialization)
1h	organizational unit offering the module	
1i	content-related prior knowledge or skills	Basic knowledge in genetics and first experience with axenic culture is recommended.
1j	learning contents	Theoretical part of the course (lectures and seminars): · Principles of plant and fungal transformation and their application · Visual markers in plant and fungal biology · Principles of fluorescence and confocal laser scanning microscopy · Tissue culture techniques for plant and fungal propagation · Theoretical basic for the genetic manipulation of lower (fungi) and higher (plants) eukaryotes · Theoretical basic for *in vivo* visualization of physiological and developmental processes in lower (fungi) and higher (plants) eukaryotes.

		Methods applied in the practical training: · Development of practical skills for generation of transgenic (plant and fungi). Stable and transient transformation via *Agrobacterium*, protoplast formation, ballistic techniques, and chemical approaches. · Tissue culture · Transient gene expression in tobacco leaves · Stable gene expression in poplar · First impressions of the use of visual markers in plant and fungal development · Fluorescence microscopy and confocal laser scanning microscopy · Yeast transformation · Functional analysis of heterologous expressed proteins
1k	learning outcomes/ competencies/ targeted competencies	· Students have a comprehensive knowledge of techniques and strategies suitable to manipulate plants and fungi · Students can perform selected approaches to generate (stable and transient) transgenics (fungi and plants) · Students can perform functional characterization of selected proteins using yeast as a toolbox Students have the competence to develop strateiesy for functional gene expression in plants and fungi. · Students can perform *in vivo* visualization of plant function · Students have the competence to present and discuss projects addressing *in vivo* visualization of physiological and developmental processes in plants and fungi · .
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☒	1	lecture(s) with	0,5	SWS/ contact hours	7	hours of presence time
☒	1	seminar(s) with	1	SWS/ contact hours	14	hours of presence time
☐		exercise(s) with		SWS/ contact hours		hours of presence time
☐		internship(s) with		sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☒	1	laboratory/laboratories with	4,5	SWS/ contact hours	63	total hours of presence time
☐		tutorial(s) with		SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

		☐ other form of course (e.g. block seminar), namely this: Klicken Sie hier, um Text einzugeben. with SWS / with totaly contact hours ☐ presence time ☐ working hours = sum of presence time and working hours: 84
	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 68
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 28
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 180
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* NO *Short description of selection option* Klicken Sie hier, um Text einzugeben.
1n	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.
1o	frequency	*(regular cycle module is offered) e.g.: winter semester, yearly or summer semester, yearly or each semester* summer semester yearly Klicken Sie hier, um Text einzugeben.
1p	duration	one semester module Klicken Sie hier, um Text einzugeben.
1q	Literature (*optional*)	Klicken Sie hier, um Text einzugeben.

1r	more information on the module (*optional*)	Klicken Sie hier, um Text einzugeben.
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☒ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☒ PL | 2 ☐ SL | ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: Protocol (50%) PL 2: Presentation, oral (50%) PL 3: Klicken Sie hier, um Text einzugeben. PL 4: Klicken Sie hier, um Text einzugeben. If necessary, further comments: Klicken Sie hier, um Text einzugeben.
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☒ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☒ Other (concrete definition is given in the examination regulations): Protocol
2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.