Universität Bremen

Medical Biometry / Biostatistics (M.Sc.)

Module Descriptions

October 2020

Universität Bremen

Contents

module code / module title

BioStat-A-1: Biometrical Methods

date / version of the module description	Klicken Sie hier, um Text einzugeben.

1	INFORMATION ON THE MODULE	
1a	module code	BioStat-A-1
1b	module title *(German title)*	Klicken Sie hier, um Text einzugeben.
1c	module title *(English title)*	Biometrical Methods
1d	credit points	6
1e	responsible for the module	Dr. Marvin N. Wright
1f	type of module	compulsory module
1g	programs using the module	Klicken Sie hier, um Text einzugeben.
1h	organizational unit offering the module	Klicken Sie hier, um Text einzugeben.
1i	content-related prior knowledge or skills	none
1j	learning contents	• Descriptive Statistics • Point and interval estimators • Principle of statistical testing (decision procedure, error rates, p-values, power) • Selected statistical testing procedures (Z-test, t-test, chi-square test, two-sample t-test) • Sample size calculation • Introduction to regression analysis and analysis of variance, as well as nonparametric procedures

1k	learning outcomes/ competencies/ targeted competencies	• Knowledge of the most important procedures of descriptive statistics • Knowledge of general methodology of sample size calculation in biometrical studies • Knowledge of the basic methods of inferential statistics • Firm apprehension of several test and analysis methods based on the normal distribution or the binomial distribution • Insight into several procedures of nonparametric statistics • Ability to apply the learned estimation and testing procedures in SAS
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	3	SWS/ contact hours	42	hours of presence time
☐	seminar(s) with		SWS/ contact hours		hours of presence time
☒ 1	exercise(s) with	1	SWS/ contact hours	14	hours of presence time
☐	internship(s) with		sum of working hours		
☐	seminar(s) with		SWS/ contact hours		total hours of presence time
☐	laboratory/laboratories with		SWS/ contact hours		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:

= 56 hours of presence time

	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: 74 hours = preparation/follow-up work of the course(s) and self-study
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 50 hours = exam preparation (incl. examination)
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 180 hours = 56 hours (from a)) + 74 hours (from b)) + 50 hours (from c))
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* Other, namely this: winter semester, every 2 years
1p	duration	one semester module
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 | 1 ☒ SL | 1 ☐ PVL | justification If necessary, further explanations: Oral examination with applications on a computer (graded) in the lecture, one portfolio (successful participation in exercises, ungraded) in the exercise
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: Klicken Sie hier, um Text einzugeben. PL 2: Klicken Sie hier, um Text einzugeben. 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): Oral examination with applications on a computer.
2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.

module code / module title

BioStat-A-2: Statistical Modeling

date / version of the module description	Klicken Sie hier, um Text einzugeben.

1	INFORMATION ON THE MODULE	
1a	module code	BioStat-A-2
1b	module title *(German title)*	Klicken Sie hier, um Text einzugeben.
1c	module title *(English title)*	Statistical Modeling
1d	credit points	12
1e	responsible for the module	Prof. Dr. Iris Pigeot
1f	type of module	compulsory module
1g	programs using the module	Klicken Sie hier, um Text einzugeben.
1h	organizational unit offering the module	Klicken Sie hier, um Text einzugeben.
1i	content-related prior knowledge or skills	none
1j	learning contents	a) Statistical modeling I • Introduction to probability calculation • Discrete and continuous random variables and their parameters, density and distribution functions • Law of large numbers, central limit theorem • Parameter estimation and confidence intervals

		b) Statistical modeling II • Multi-dimensional distributions, correlation • Representation using matrices and vectors • Linear regression, in particular parametrization of explanatory variables, dummy and effect coding of factors • Parameter estimation, least squares methods and normal equations • Model selection and variable selection • Regression diagnostics • General linear models (heteroscedastic and correlated errors)
1k	learning outcomes/ competencies/ targeted competencies	a) Statistical modeling I • Knowledge of the basics of biometric models • Comprehension of variability: random and systematic effects • Comprehension of basic probability calculation • Comprehension of the basics of inferential statistics b) Statistical modeling II • Knowledge of the linear model, in particular comprehension of model assumptions, mathematical reasoning and the mathematical formulation • Knowledge of possible sources of modeling errors • Ability to independently plan and analyze a study applying linear models • Competence in the interpretation of parameters and model diagnostics • Competence in using modeling and analysis software • Competence in variable selection, model selection and the construction of prognostic indices
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**

☒	2	lecture(s) with	3	SWS/ contact hours	84	hours of presence time
☐		seminar(s) with		SWS/ contact hours		hours of presence time
☒	2	exercise(s) with	1	SWS/ contact hours	28	hours of presence time

		☐	internship(s) with	sum of working hours	
		☐	seminar(s) with	SWS/ contact hours	total hours of presence time
		☐	laboratory/laboratories with	SWS/ contact hours	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: 112 hours = presence time and working hours			
	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: 148 hours = preparation/follow-up work of the courses and self-study			
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 100 hours = exam preparation (incl. examination)			
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 360 hours = 112 hours (from a)) + 148 hours (from b)) + 100 hours (from c))			
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* Other, namely this: every 2 years, winter semester and following summer semester
1p	duration	two semester module
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 | 2 ☐ PVL | justification If necessary, further explanations: one portfolio (successful participation in exercises, ungraded) in every exercises, one oral examination (graded) in each lecture
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: Klicken Sie hier, um Text einzugeben. PL 2: Klicken Sie hier, um Text einzugeben. 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):
2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.

module code / module title

BioStat-A-3: Data Management and Statistical Programming

date / version of the module description	Klicken Sie hier, um Text einzugeben.

1	INFORMATION ON THE MODULE	
1a	module code	BioStat-A-3
1b	module title *(German title)*	Klicken Sie hier, um Text einzugeben.
1c	module title *(English title)*	Data Management and Statistical Programming
1d	credit points	9
1e	responsible for the module	Dr. Martin Scharpenberg
1f	type of module	compulsory module
1g	programs using the module	Klicken Sie hier, um Text einzugeben.
1h	organizational unit offering the module	Klicken Sie hier, um Text einzugeben.
1i	content-related prior knowledge or skills	none
1j	learning contents	a) Data Management: • Tasks and processes of data management • Principles of designing Case Report Forms (CRF) • Data models, data bases • Data entry, plausibility checks, queries • Automatic/semi-automatic data capture • Data base freezing, data integrity, data security • Quality management • Randomization • Practical work process with excercies b) Statistical Programming

		• Performance spectrum of statistical analysis programs • Efficient organization of data management tasks • Solving analysis exercises in SAS-programming including the usage of macros • Knowledge of areas of application, possibilities and limitations of software solutions • Insight to the possibilities to extent the biometrical methodology in the software, in particular to the implementation of methodology which is not already included in the software • Planning and analysis of data management tasks and conduct of analyses in SAS using generated data
1k	learning outcomes/ competencies/ targeted competencies	a) Data Management: • Knowledge of tasks and processes of the data management in a clinical trial • Knowledge of purpose and content of essential documents that are produced by data management in the course of a clinical trial • Knowledge of guidelines for the design of such documents • Knowledge of typical software to process the tasks of data management in a clinical trial b) Statistical Programming • Ability to execute the tasks of data management in a clinical trial • Ability to use software relevant for data management and analysis tasks • Knowledge of possibilities to extent the biometrical methods already included in software packages
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**

☐	number	lecture(s) with	number	SWS/ contact hours	number	hours of presence time
☐		seminar(s) with		SWS/ contact hours		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
☐		laboratory/laboratories with		SWS/ contact hours		total hours of presence time
☐		tutorial(s) with		SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

		☒ 2 other form of course (e.g. block seminar), namely this: Practical training on computers with 4 SWS / with totaly 112 contact hours ☒ presence time ☐ working hours = sum of presence time and working hours: = 112 hours of presence time
	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: = 58 hours for preparation/follow-up work or self-study
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: = 100 hours of exam preparation (incl. examination)
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 270 hours = 112 hours (from a)) + 58 hours (from b)) + 100 hours (from c))
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* Other, namely this: Every two years, winter semester and following summer semester
1p	duration	two 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 | number ☐ PVL | justification If necessary, further explanations: One oral examination with applications on a computer in each course
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: Klicken Sie hier, um Text einzugeben. PL 2: Klicken Sie hier, um Text einzugeben. 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): Oral examination with applications on a computer
2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.

module code / module title

BioStat-A-4: Basic Epidemiology

date / version of the module description	Klicken Sie hier, um Text einzugeben.

1	INFORMATION ON THE MODULE	
1a	module code	BioStat-A-4
1b	module title *(German title)*	Klicken Sie hier, um Text einzugeben.
1c	module title *(English title)*	Basic Epidemiology
1d	credit points	6
1e	responsible for the module	Prof. Dr. Wolfgang Ahrens
1f	type of module	compulsory module
1g	programs using the module	Klicken Sie hier, um Text einzugeben.
1h	organizational unit offering the module	Klicken Sie hier, um Text einzugeben.
1i	content-related prior knowledge or skills	none
1j	learning contents	• Basic Epidemiology, in particular goals and methods of epidemiology • Definitions, fundamental concepts, as well as typical problems and approaches of epidemiology • Interpretation and assessment of epidemiological studies using publications
1k	learning outcomes/ competencies/ targeted competencies	• Knowledge of epidemiological study designs • Knowledge of descriptive and comparative epidemiological measures and standardization • Understanding of sources of error, bias and confounding, misclassification • Knowledge of experimental and observational study designs

		• Knowledge of data sources and data acquisition • Knowledge of methods for quality assurance and good epidemiological practice • Ability interpret and critically assess epidemiological study results with regard to methods, presentation of results and discussion • Ability to present study results • Ability to moderate a scientific discussion
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	2	SWS/ contact hours	28	hours of presence time
☒	1	seminar(s) with	2	SWS/ contact hours	28	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
☐		laboratory/laboratories with		SWS/ contact hours		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:

= 56 hours of presence time

	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: 51 hours = preparation/follow-up work oft he course(s) and self study
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 70 hours = exam preparation (incl. examination)
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 180 hours = 56 hours (from a)) + 51 hours (from b)) + 70 hours (from c))
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* Other, namely this: Every 2 years, summer semester and following winter semester
1p	duration	two 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 | number ☐ PVL | justification If necessary, further explanations: One written examination (basic epidemiology), one oral presentation and moderation of a journal club
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: Klicken Sie hier, um Text einzugeben. PL 2: Klicken Sie hier, um Text einzugeben. 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): Oral presentation and moderation of a journal club: Each participant will give a brief presentation on a specific epidemiological topic. In addition, participants will prepare and moderate a journal club where an epidemiological publication will be presented and discussed
2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.

module code / module title

BioStat-A-5: Biometrical Methods – Special Aspects

date / version of the module description	Klicken Sie hier, um Text einzugeben.

1	INFORMATION ON THE MODULE	
1a	module code	Biostat-A-5
1b	module title *(German title)*	Klicken Sie hier, um Text einzugeben.
1c	module title *(English title)*	Biometrical Methods – Special Aspects
1d	credit points	15
1e	responsible for the module	Prof. Dr. Werner Brannath
1f	type of module	compulsory module
1g	programs using the module	Klicken Sie hier, um Text einzugeben.
1h	organizational unit offering the module	Klicken Sie hier, um Text einzugeben.
1i	content-related prior knowledge or skills	Klicken Sie hier, um Text einzugeben.
1j	learning contents	a) Multiple Testing Problems • Basics and theory of multiple testing • Methods for comparisons of multiple groups and subgroup analyses for multiple endpoints • Graphical multiple tests b) Survival Analysis • Basics: Censoring, Survival function, hazard and cumulative hazard • Nonparametric, semiparametric and parametric methods

- Complex modeling approaches
- Sample size calculation

c) Nonparametric Methods

- Ideas and basics of nonparametric methods (methods without distributional assumptions)
- Methods for paired and unpaired samples, for two or more groups, for multi factorial designs

d) Bayes Statistics

- Multivariate, marginal and conditional distributions and Bayes' Rule (discrete and continuous)
- Principle of Bayesian inference
- Conjugate Priors with examples (e.g. Beta-binomial model for a proportion, Poisson-gamma model for a rate, Normal-normal model for a mean)
- Mixtures of conjugate priors
- Improper, objective, Jeffrey and reference priors
- Computational approaches (e.g. Markov Chain Monte Carlo (MCMC) method, Gibbs sampling, Metropolis-Hastings (MH) sampling, MCMC)
- Empirical Bayes (optional)
- Frequentist properties of Bayesian methods (optional)
- Application of Bayesian methods in clinical trials and medical studies

e) Problems of biometrical research

- Current examples of biometrical research, based on the particular interests of the students with regard to their master thesis. An oral presentation is given which approaches the topic of the master thesis systematically:
  - *i. General overview over the medical and methodological problem*
  - *ii. Narrowing the topic to a relevant core*
  - *iii. Approach and working program for the work on the problem*

1k learning outcomes/ competencies/ targeted competencies

- Knowledge of the differentiation and specialization of the biometrical methodology to specific questions
- Ability to apply these methods to clinical practice and to interpret the results
- Competence in the application of corresponding software

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

☒	2	lecture(s) with	2	SWS/ contact hours	56	hours of presence time
☒	3	seminar(s) with	2	SWS/ contact hours	84	hours of presence time
☒	2	exercise(s) with	1	SWS/ contact hours	28	hours of presence time

		☐	internship(s) with	sum of working hours	
		☐	seminar(s) with	SWS/ contact hours	total hours of presence time
		☐	laboratory/laboratories with	SWS/ contact hours	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: = **168 hours of presence time and working hours**			
	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: 150 hours for preparation/follow-up work of the courses and self-study			
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 132 hours of exam preparation and examination			
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 450 hours = 168 hours (from a)) + 150 hours (from b)) + 132 hours (from c))			
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* Other, namely this: Every two years, winter semester
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 | 4 ☒ SL | 1 ☐ PVL | justification If necessary, further explanations: One portfolio (successful participation in exercises and written examination, graded) in each lecture and corresponding exercise (survival analysis and multiple testing), one oral presentation on problems of biometrical research (ungraded), one oral presentation and written assignment on non-parametric statistics (graded), one oral presentation and written assignment on bayes statistics (graded)
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: Klicken Sie hier, um Text einzugeben. PL 2: Klicken Sie hier, um Text einzugeben. 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): Klicken Sie hier, um Text einzugeben.
2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.

module code / module title

BioStat-A-6: Complex Statistical Modeling

date / version of the module description	Klicken Sie hier, um Text einzugeben.

1	INFORMATION ON THE MODULE	
1a	module code	BioStat-A-6
1b	module title *(German title)*	Klicken Sie hier, um Text einzugeben.
1c	module title *(English title)*	Complex Statistical Modeling
1d	credit points	6
1e	responsible for the module	Dr. Martin Scharpenberg
1f	type of module	compulsory module
1g	programs using the module	Klicken Sie hier, um Text einzugeben.
1h	organizational unit offering the module	Klicken Sie hier, um Text einzugeben.
1i	content-related prior knowledge or skills	Klicken Sie hier, um Text einzugeben.
1j	learning contents	• Theory of the generalized linear model, in particular: • Univariate and multiple logistic regression • Logit-transformation, odds ratio • Parameter estimation (maximum likelihood), interpretation of the parameters of the generalized linear model • Model selection, variable selection, quality criteria, diagnostics • Exponential families, link function, canonical link

		• Poisson regression • Proportional odds model, logistic regression with multiple categories • Introduction to generalized estimating equations • Introduction to the generalized linear mixed model • Introduction to propensity score methods
1k	learning outcomes/ competencies/ targeted competencies	• Knowledge of definitions, properties and mathematical basics of complex models, in particular of generalized linear models • Overview of differentiation and specialization of the models covered regarding special questions • Knowledge of the areas of application, possibilities and limits of the models • Establishing connections between modeling and methods of planning and analysis of studies • Knowledge of the corresponding model related theories of analysis (estimation, testing) • Knowledge of the corresponding methods of sample size calculation • Ability to choose appropriate models in complex designs • Ability to assess the appropriateness of a chosen model • Ability to independently perform the biometrical planning, analysis and interpretation in such models
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	3	SWS/ contact hours	42	hours of presence time
☐		seminar(s) with		SWS/ contact hours		hours of presence time
☒	1	exercise(s) with	1	SWS/ contact hours	14	hours of presence time
☐		internship(s) with		sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐		laboratory/laboratories with		SWS/ contact hours		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: = 56 hours of presence time and working hours
	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: 74 hours = preparation/follow-up work of the courses and self-study
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 50 hours = exam preparation (incl. examination)
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 180 hours = 56 hours (from a)) + 74 hours (from b)) + 50 hours (from c))
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* Other, namely this: winter semester, every 2 years
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 | 1 ☒ SL | 1 ☐ PVL | justification If necessary, further explanations: One oral examination in the lecture (graded), one portfolio (successful participation in exercises, ungraded)
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: Klicken Sie hier, um Text einzugeben. PL 2: Klicken Sie hier, um Text einzugeben. 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):
2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.

module code / module title

BioStat-B-1: Clinical / Diagnostic Trials, Laws, Guidelines and Ethics

date / version of the module description	Klicken Sie hier, um Text einzugeben.

1	**INFORMATION ON THE MODULE**	
1a	module code	Biostat-B-1
1b	module title *(German title)*	Klicken Sie hier, um Text einzugeben.
1c	module title *(English title)*	Clinical / Diagnostic Trials, Laws, Guidelines and Ethics
1d	credit points	15
1e	responsible for the module	Dr. Martin Scharpenberg
1f	type of module	compulsory module
1g	programs using the module	Klicken Sie hier, um Text einzugeben.
1h	organizational unit offering the module	Klicken Sie hier, um Text einzugeben.
1i	content-related prior knowledge or skills	None
1j	learning contents	a) Clinical Trials I • Study types from observational studies to randomized trials • Causality, stochastics, evidence, question, hypotheses, trial design • Determination of target population, criteria for evaluation and parameters • Randomization and blinding • Sample size calculation b) Clinical Trials II

		• Principles of conducting randomized therapy trials: Organization, documentation and data management, clinical monitoring • Analysis and interpretation of randomized trials • Analysis populations: Per protocol, full analysis set, intention to treat principle • Estimands • Overview of common statistical procedures • Handling of drop outs and missing data • Analysis of follow-up data • Interim analysis strategies • Subgroup analyses • Confirmatory vs. exploratory analyses c) Diagnostic Studies • Definition and examples for diagnostic tests and medical screening/classification tools • The development and investigation of diagnostics tests and medical screening/classification tools • Measures of test and classification accuracy (e.g. accuracy, sensitivity, specificity, ROC curve) • Statistical methods for the estimation of accuracy • Definition and estimation of positive and negative predictive values • Statistical methods for the comparison of diagnostic tests • Study designs and hypothesis tests for diagnostics studies • Methods to account for covariate effects on diagnostic tests • Statistical methods for biomarker selection and biomarker combination d) Laws & Guidelines • Basic legal terms • Overview of national and international regulations and standards in clinical research • International Conference on Harmonization (ICH) guidelines • Special conditions and requirements for special populations (e.g. children, persons who are incapable of giving consent) e) Ethics • Basic ethical requirements • Bioethics • Declaration of Helsinki • Ethical reasoning for the quality assurance in clinical research • Ethical principles of good clinical practice (GCP)
1k	learning outcomes/ competencies/ targeted competencies	a) Clinical Trials I • Knowledge of general basics and the design of clinical trials • Ability to biometrically plan clinical trials according to legal and regulatory requirements • Competence in elaboration of trial designs and aspects of trial planning, as well as the ability to impart those to an inderdisciplinary team • Ability to conduct the quality management of a clinical trial and to critically assess scientific publications of study results b) Clinical Trials II • Knowledge of basic aspects of the conduct, analysis and interpretation of clinical trials in special consideration of legal environment as well as the methodological and organizational aspects • Ability to plan, support and correctly analyze biometrical trials according to legal and regulatory requirements

- Knowledge of the corresponding statistical methods
- Knowledge of the measures for securing equality of observation and treatment
- Ability to identify confounding effects and bias
- Competence in imparting study aspects in an interdisciplianary team

c) Diagnostic Studies

- To understand basic and more advanced principles for the investigation and evaluation of diagnostic tests and medical screening/classification tools.
- To be able to describe and estimate test and classification accuracy
- To know how to plan and analyze a typical diagnostic study
- Basic knowledge of statistical methods for biomarker selection and combination

d) Laws & Guidelines

- Knowledge of the legal basics for clinical research in German, European and international law, as well as the relevant regulatory provisions and guidelines
- Knowledge of the main laws and guidelines and their application
- Knowledge of the principles of quality assurance
- Competence in dealing with exceptional cases
- Competence in working alongside regulatory authorities and legal practitioners
- Ability to independently make out legal texts

e) Ethics

- Knowledge of ethical principles of medical research
- Ability to introduce ethical aspects in the planning of clinical trials
- Ability to critically assess the ethical aspects of study concepts
- Knowledge of ethical aspects of quality assurance
- Ethical competence in dealing with exceptional cases

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

☒	5	lecture(s) with	2	SWS/ contact hours	140	hours of presence time
☐		seminar(s) with		SWS/ contact hours		hours of presence time
☒	3	exercise(s) with	1	SWS/ contact hours	42	hours of presence time
☐		internship(s) with		sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐		laboratory/laboratories with		SWS/ contact hours		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: 182 hours of presence time and working hours
	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: 160 hours for preparation/follow-up work of the courses and self-study
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 108 hours of exam preparation (incl. examination)
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 450 hours = 182 hours (from a)) + 160 hours (from b)) + 108 hours (from c))
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* Other, namely this: Every two years, winter semester and following summer semester

1p	duration	two 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 | 5 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations: One portfolio (successful participation in exercises and written exam) in each lecture with corresponding exercise (clinical trials I, clinical trials II, diagnostic studies), one written exam in each lecture without exercise (laws & guidelines, ethics)
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: Klicken Sie hier, um Text einzugeben. PL 2: Klicken Sie hier, um Text einzugeben. 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): Klicken Sie hier, um Text einzugeben.

2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.

module code / module title

BioStat-B-2: Fundamentals of Medicine

date / version of the module description	Klicken Sie hier, um Text einzugeben.

1	**INFORMATION ON THE MODULE**	
1a	module code	BioStat-B-2
1b	module title *(German title)*	Klicken Sie hier, um Text einzugeben.
1c	module title *(English title)*	Fundamentals of Medicine
1d	credit points	12
1e	responsible for the module	Prof. Dr. Bernd Mühlbauer
1f	type of module	compulsory module
1g	programs using the module	Klicken Sie hier, um Text einzugeben.
1h	organizational unit offering the module	Klicken Sie hier, um Text einzugeben.
1i	content-related prior knowledge or skills	None
1j	learning contents	a) Medical Basics • Introduction to general medical terminology, nomenclature and medical approaches • Anatomy and function of muscles and bones • Anatomy and function of internal organs (e.g. cardiovascular system, liver, pancreas, gastrointestinal tract, kidneys and urinary tract • Neuroanatomy and neurophysiology • Physiology of sensory perception • Trauma and growth

		b) Molecular Medicine • Cell metabolism at the example of glucose • Birth and death of a cell, regulation of cell functions: hormones, signal transduction • Gene expression • Hederitary diseases (basics and perinatal diagnostics) • Hemostasis • Medical analytical laboratory • Basics of microbiology: Parasites, Bacteria, Fungi • Diagnostic in microbiology c) Pharmacotherapy • Demarcation of experimental and clinical pharmacology • Basics of pharmacodynamics and pharmacokinetics, PK/PD modeling • Choosing a efficient and rational drug therapy • Adiposis, Diabetes, Dyslipidemia • Sytematology and pharmacotherapeutic approaches to neurological diseases • Systematology of psychiatric drugs • Clinic and therapy of mental disorders • Drug therapy of Asthma and COPD • Drugs for pain therapy, principles of anesthesia • Bone diseases • Clinic and therapy of gastrointestinal diseases • Clinic and therapy of infectious diseases d) Special Areas of Medicine (e.g. Oncology) • Medical terminology and basic principles of a special area of medicine
1k	learning outcomes/ competencies/ targeted competencies	a) Medical Basics • Knowledge and understanding of basic medical terminology • Knowledge of basic anatomy, physiology, as well as knowledge of organ systems • Knowledge of key medical terms of internal medicine • Competence in applying medical vocabulary in dialogues with physicians an in the planning, conduct and analysis of clinical trials b) Molecular Medicine • Knowledge of basic molecular medicine • Basic knowledge of cell functions, hemostasis and laboratory medicine c) Pharmacotherapy • Knowledge of key terms of pharmacokinetics, pharmacodynamics and pharmacogenomics • Knowledge of the tools of experimental and clinical pharmacology for medical research d) Special Areas of Medicine • Knowledge of key terms of a special area of medicine (e.g. oncology) • Knowledge of common therapy appraoches in that area

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**

☒	3 / 1*	lecture(s) with	2 / 3*	SWS/ contact hours	126	hours of presence time
☐		seminar(s) with		SWS/ contact hours		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
☐		laboratory/laboratories with		SWS/ contact hours		total hours of presence time
☐		tutorial(s) with		SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☒ 1 other form of course (e.g. block seminar), namely this:

Hospital day: The students visit the hospital for one day and accompany a physician during this time to experience the working environment and processes in a hospital.

*Note: There will be 3 lectures with 2 SWS contact hours and one lecture with 3 SWS contact hours, resulting in a total of 126 hours of presence time for the lectures, as indicated above

with	1	SWS / with totaly	14	contact hours	☒ presence time	☒ working hours

= sum of presence time and working hours:

140 hours of presence time and working hours

	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: 100 hours (working hours for preparation/follow-up work of the courses and self-study

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 120 hours of exam preparation incl. examination
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 360 hours = 140 hours (from a)) + 100 hours (from b)) + 120 hours (from c))
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* Other, namely this: Every 2 years, starting in winter semester
1p	duration	Other, namely this: Three semester module
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 | 3 ☒ SL | 1 ☐ PVL | justification If necessary, further explanations:

		One written examination (graded) in each semester (1 for medical basics + molecular medicine, 1 for pharmacotherapy, 1 for special areas of medicine), one written assignment for the hospital day (ungraded)
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: Klicken Sie hier, um Text einzugeben. PL 2: Klicken Sie hier, um Text einzugeben. 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):
2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.

module code / module title

BioStat-C-1: Internship

date / version of the module description	Klicken Sie hier, um Text einzugeben.

1	INFORMATION ON THE MODULE	
1a	module code	BioStat-C-1
1b	module title *(German title)*	Klicken Sie hier, um Text einzugeben.
1c	module title *(English title)*	Internship
1d	credit points	6
1e	responsible for the module	Dr. Stephan Kloep
1f	type of module	compulsory module
1g	programs using the module	Klicken Sie hier, um Text einzugeben.
1h	organizational unit offering the module	Klicken Sie hier, um Text einzugeben.
1i	content-related prior knowledge or skills	none
1j	learning contents	Students shall experience working situations and job requirements in a pertinent professional field of activity inside or outside the university. They should learn to define and analyze the occurring problems and tasks based on their professional qualification acquired until then. Furthermore, they should learn to develop and realize approaches to those problems and tasks.
1k	learning outcomes/ competencies/ targeted competencies	Klicken Sie hier, um Text einzugeben. • Develop and promote the professional orientation • Imparting deepened knowledge of the organization and functioning of a professional field • Apply the knowledge and skills acquired in the studies

		• Promote the development of practical questions in the studies • Give an insight and contacts to possible professional fields
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**

☐	number	lecture(s) with	number	SWS/ contact hours	number	hours of presence time
☐		seminar(s) with		SWS/ contact hours		hours of presence time
☐		exercise(s) with		SWS/ contact hours		hours of presence time
☒	1	internship(s) with	170	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐		laboratory/laboratories with		SWS/ contact hours		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:

= 170 hours of working hours

	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: 0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: = 10 hours of exam preparation incl. examination
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 180 hours = 170 hours from a) + 0 hours from b) + 10 hours from c)
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* Wählen Sie ein Element aus. 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 | 0 ☒ SL | 1 ☐ PVL | justification If necessary, further explanations:

		The students will produce an internship report of approx. 20 pages (appendix excluded). The report shall contain details on the structure and operation of the workplace, as well as on the student's own activities. The report shall further contain the essential results of the own work as well as a reflection on the experience gained during the internship. The report is to be handed in at the person responsible for the module within 4 weeks after completion of the internship. Personal details are to be anonymized in the report. A publication of the report is only possible with consent of the company/institution of the internship. Access to the report by other students or by university teaching staff is only permitted with consent of the author of the report.
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: Klicken Sie hier, um Text einzugeben. PL 2: Klicken Sie hier, um Text einzugeben. 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): Klicken Sie hier, um Text einzugeben.
2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.

module code / module title

BioStat-D-1: Module Master Thesis

date / version of the module description	Klicken Sie hier, um Text einzugeben.

1	**INFORMATION ON THE MODULE**	
1a	module code	BioStat-D-1
1b	module title *(German title)*	Klicken Sie hier, um Text einzugeben.
1c	module title *(English title)*	Modul Master Thesis
1d	credit points	30
1e	responsible for the module	Prof. Dr. Werner Brannath
1f	type of module	compulsory module
1g	programs using the module	Klicken Sie hier, um Text einzugeben.
1h	organizational unit offering the module	Klicken Sie hier, um Text einzugeben.
1i	content-related prior knowledge or skills	Klicken Sie hier, um Text einzugeben.
1j	learning contents	• Scientific work under supervision • Specialization in a subject of biostatistics
1k	learning outcomes/ competencies/ targeted competencies	Ability to work independently and scientifically, in particular: • Independently search for and becoming acquainted with relevant literature • Reflection of current state of research • Development of own research results if possible • Adherence to rules of good scientific practice

		Ability to write a comprehensive academic work Ability to present the research work orally
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**

☐ number	lecture(s) with	number	SWS/ contact hours	number	hours of presence time
☐	seminar(s) with		SWS/ contact hours		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
☐	laboratory/laboratories with		SWS/ contact hours		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:

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with	SWS / with totaly	contact hours	☐ presence time	☐ working hours

= sum of presence time and working hours:

0 hours of presence time

	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: 0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 900 hours of exam preparation (incl. examination)
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 900 hours (from c))
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* each semester 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 | number ☐ PVL | justification If necessary, further explanations:

		One master thesis, one colloquium on the topic of the master thesis
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: Master Thesis (70%) PL 2: Colloquium (30%) 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): Klicken Sie hier, um Text einzugeben.
2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.