Module Name	Module Code
Advanced Statistics in Animal Breeding and Genomics	AEF-agr822e
Module Coordinator	
Prof. Dr. Georg Thaller	
Organizer	
Institute of Animal Breeding and Husbandry - Animal Breeding and Genetics	
Faculty	
Faculty of Agricultural and Nutritional Sciences	
Examination Office	
Faculty of Agricultural and Nutritional Sciences - Examination Office	

ECTS Credits	6
Evaluation	Graded
Duration	ein Semester
Frequency	Only takes place during summer semesters
Workload per ECTS Credit	30 hours
Total Workload	180 hours
Contact Time	60 hours
Independent Study	120 hours
Teaching Language	English

Module Courses			
Course Type	**Course Name**	**Compul-sory/Optional**	**SWS**
Lecture	Advanced Statistics in Animal Breeding and Genomics	Compulsory	3
Practical exercise	Advanced Statistics in Animal Breeding and Genomics	Compulsory	2
Prerequisits for Admission to the Examination(s)			
regular visit: practical exercise			

Examination(s)				
Examination Name	**Type of Examination**	**Evaluation**	**Compulsory / Optional**	**Weighting**
Oral Examination: Advanced Statistics in Animal Breeding and Genomics	Oral Examination	Graded	Compulsory	100
Further Information on the Examination(s)				
Will take place for the last time in the summer semester 2020. 1.+2. period in summer semester 1. period in winter semester examiner: Prof. Dr. Thaller QIS: 64301 with exam 64310				

Course Content
Theory of probabilities, distributions and their properties, handling of continuous and categorial data and variables, estimation procedures, Least Squares, Maximum Likelihood, Bayes Concepts, testing of hypotheses, likelihood-ratio test, algorithms, programming in R-language, own examples, graphical illustration, resampling techniques, breeding values estimation in detailed programs, solving algorithms, most relevant developments in genomics.

Learning Outcome
Students achieve deeper insights in probability theory and statistical concepts necessary in statistical genetics as applied in animal breeding. They get aware of concepts, implementation and application of statistical approaches to utilize data in an appropriate manner. They will be able, to write programs for solving examples for their own. Next they will get an overview about current procedures and program packages to utilize high dimensional genomic data. They will be able to judge new developments in this area.

Reading List
Casella, Berger "Statistical Inference", Sorenson, Gianola "Likelihood, Bayesian, and MCMC Methods in Quantitative Genetics, Weller "Quantitative Trait Loci Analysis in Animals", Siegmund, Yakir "The Statistics of Gene Mapping", Wu, Ma, Casella "Statistical Genetics of Quantitative Traits"

Additional Information
Maximum number of participants: 15 - Up to 5 places will be allocated preferably to students in the Dairy Science master's programm Enrollment by Email to OLAT within workdays Monday through Friday in the 1st week of the 2. audit period of the preceding semester. Following information are necessary: matriculation number last name first name striven degree study program stu-Email The allocation of the places takes place in the 2nd week of the 2. audit period of the preceding semester. Notification will be sent to the stu-email address. Acceptance of the place by students only through participation at the first day of the course.

Use	Compulsory / Optional	Semester
Master, 1-Subject, Agricultural Sciences, Specialisation Agricultural Economics, (Version 2017)	Compulsory	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agricultural Economics, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Special. Agricultural Economics and Agribusiness # Specific Field of Study: Agricultural Economics, (Version 2008)	Optional	-
Master, 1-Subject, Agricultural Sciences, Special. Agricultural Economics and Agribusiness # Specific Field of Study: Agribusiness, (Version 2008)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agribusiness, (Version 2017)	Compulsory	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agribusiness, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Crop Sciences, (Version 2017)	Compulsory	-
Master, 1-Subject, Agricultural Sciences, Specialisation Crop Sciences, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Crop Sciences, (Version 2008)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Animal Sciences, (Version 2017)	Compulsory	-
Master, 1-Subject, Agricultural Sciences, Specialisation Animal Sciences, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Animal Sciences, (Version 2008)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Environmental Sciences, (Version 2017)	Compulsory	-
Master, 1-Subject, Agricultural Sciences, Specialisation Environmental Sciences, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Environmental Sciences, (Version 2008)	Optional	-
Master, 1-Subject, Dairy Science, (Version 2017)	Compulsory	-
Master, 1-Subject, Nutritional and Food Science, (Version 2013)	Optional	-
Master, 1-Subject, Nutritional and Consumer Economics, (Version 2017)	Compulsory	-
Master, 1-Subject, Nutritional and Consumer Economics, (Version 2013)	Optional	-
Master, 1-Subject, Nutritional Sciences and Household Economics, Specialisation Nutritional and Consumer Economics, (Version 2008)	Optional	-
Master, 1-Subject, Nutritional Sciences and Household Economics, Specialisation Nutritional Sciences, (Version 2008)	Optional	-