

<b>Module Name</b>	<b>Module Code</b>
Applications of Genomics in Agriculture	AEF-agrig007
<b>Module Coordinator</b>	
Prof. Dr. Daguang Cai	
<b>Organizer</b>	
Institute of Phytopathology - Molecular Phytopathology	
Institute of Plant Nutrition and Soil Science - Plant Nutrition	
Institute of Crop Science and Plant Breeding - Plant Breeding	
Institute of Animal Breeding and Husbandry - Animal Breeding and Genetics	
<b>Faculty</b>	
Faculty of Agricultural and Nutritional Sciences	
<b>Examination Office</b>	
Faculty of Agricultural and Nutritional Sciences - Examination Office	

<b>ECTS Credits</b>	6
<b>Evaluation</b>	Graded
<b>Duration</b>	one semester
<b>Frequency</b>	Only takes place during summer semesters
<b>Workload per ECTS Credit</b>	30 hours
<b>Total Workload</b>	180 hours
<b>Contact Time</b>	60 hours
<b>Independent Study</b>	120 hours
<b>Teaching Language</b>	English

<b>Further Information on the Teaching Language</b>			
one semester			
<b>Recommended Requirements</b>			
Advanced understanding of genetics, molecular biology, animal and plant breeding as well as plant nutrition and phytopathology			
<b>Module Courses</b>			
<b>Course Type</b>	<b>Course Name</b>	<b>Compul- sory/Optional</b>	<b>SWS</b>
Lecture	Application of Genomics in Animal Breeding	Compulsory	1
Lecture	Application of Genomics in Plant Breeding	Compulsory	1
Lecture	Application of Genomics in Plant Nutrition	Compulsory	1
Lecture	Application of Genomics in Phytopathology	Compulsory	1

<b>Examination(s)</b>				
<b>Examination Name</b>	<b>Type of Examination</b>	<b>Evaluation</b>	<b>Compulsory / Optional</b>	<b>Weighting</b>
Oral Examination: Applications of Genomics in Agriculture	Oral Examination	Graded	Compulsory	50
Oral Examination: Applications of Genomics in Agriculture	Oral Examination	Graded	Compulsory	50
<b>Further Information on the Examination(s)</b>				
1.+2. period in summersemester 1. period in wintersemester				
examiner: 50% Prof. Dr. Thaller, Prof. Dr. Jung, 50% Prof. Dr. Mühling, Prof. Dr. Cai QIS: 90700 with number of Examination 90710 + 90720				

<b>Course Content</b>
Genomics of inherited defects and disease resistance in livestock; procedures and techniques to identify causal genes and causal polymorphisms including SNPs and CNVs. Application of genomics in plant genetics and breeding: Genomics based selection, genomic resources for markers, genomics for increasing genetic variation, gene identification from plant genomes Genomics of plant defence systems: PTI, ETI, R genes and RGAs; genetic and technical engineering of plant disease resistance; genomics-based molecular diagnosis; molecular plant-parasite interaction-based plant protection strategy Molecular characterization of transport carrier and channels, quality aspects as affected by plant nutrition, molecular adaptation and tolerance mechanisms under abiotic stresses
<b>Learning Outcome</b>
Advanced understanding of the application of genomics in agricultural research and practice.
<b>Reading List</b>
Lecture contents and slides, scientific literatures, review articles and textbooks, internet links are online available, and will be introduced at the beginning of the course. <ul style="list-style-type: none"> <li>• Kole C, Abbott AG (2008) Principles and Practices of Plant Genomics. Science Publishers, Enfield, New Hampshire</li> <li>• Xu X, Liu X, Ge S, Jensen JD, Hu F, Li X, Dong Y, Gutenkunst RN, Fang L, Huang L, Li J, He W, Zhang G, Zheng X, Zhang F, Li Y, Yu C, Kristiansen K, Zhang X, Wang J, Wright M, McCouch S, Nielsen R, Wang J, Wang W (2012) Resequencing 50 accessions of cultivated and wild rice yields markers for identifying agronomically important genes. Nat Biotech 30: 105-111</li> <li>• Muñoz, M., et al. "Genomic diversity, linkage disequilibrium and selection signatures in European local pig breeds assessed with a high density SNP chip." Scientific reports 9.1 (2019): 1-14.</li> <li>• Mackay, T. F. et al. (2009). The genetics of quantitative traits: challenges and prospects. Nature Review Genetics 10(8): 565-77.</li> <li>• Thomas Wolpert, Tomonori Shiraishi, Alan Collmer, Kazuya Akimitsu and Jane Glazebrook (2017): Genome-Enabled Analysis of Plant-Pathogen Interactions</li> <li>• Singh, Archana, Singh, Indrakant K. (2018) Molecular Aspects of Plant-Pathogen Interaction Molecular Aspects of Plant-Pathogen Interaction</li> <li>• Medina, Carlos, López-Baena, Francisco Javier (2018) Host-Pathogen Interactions: Methods and Protocols</li> </ul>

<b>Additional Information</b>
<p>Maximum number of participants: 20            Enrollment by 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</p> <p>The allocation of the places takes place in the 2nd week of the 2. audit period of the preceding semester. Acceptance of the place by students only through participation at the first day of the course. Students without a place can get a place at the first day of the course by move-up procedure.</p>

<b>Use</b>	<b>Compulsory / Optional</b>	<b>Semester</b>
Master, 1-Subject, Agricultural Sciences, Specialisation Agricultural Economics, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agricultural Economics, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agribusiness, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agribusiness, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Crop Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Crop Sciences, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Animal Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Animal Sciences, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Environmental Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Environmental Sciences, (Version 2013)	Optional	-
Master, 1-Subject, AgriGenomics, (Version 2017)	Compulsory	-
Master, 1-Subject, AgriGenomics, (Version 2010)	Compulsory	-
Master, 1-Subject, Dairy Science, (Version 2017)	Optional	-
Master, 1-Subject, Nutritional and Food Science, (Version 2013)	Optional	-
Master, 1-Subject, Nutritional and Consumer Economics, (Version 2017)	Optional	-
Master, 1-Subject, Nutritional and Consumer Economics, (Version 2013)	Optional	-