

<b>Module Name</b>	<b>Module Code</b>
Selection in Plant Breeding	agrigAEF020-02b
<b>Module Coordinator</b>	
Prof. Dr. Christian Jung	
<b>Organizer</b>	
Institute of Crop Science and Plant Breeding - Plant Breeding	
<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>Recommended Requirements</b>			
Advanced understanding of genetics and breeding methodologies according to modules Introduction to Molecular Biology AEF-agrig001 and Introduction to Crop and Animal breeding AEF-agrig004			
<b>Module Courses</b>			
<b>Course Type</b>	<b>Course Name</b>	<b>Compulsory/Optional</b>	<b>SWS</b>
Practical exercise	Selection in Plant Breeding	Compulsory	1
Lecture	Selection in Plant Breeding	Compulsory	1
Internship	Selection in Plant Breeding	Compulsory	2

<b>Examination(s)</b>				
<b>Examination Name</b>	<b>Type of Examination</b>	<b>Evaluation</b>	<b>Compulsory / Optional</b>	<b>Weighting</b>
Protocol: Selection in Plant Breeding	Protocol	Graded	Compulsory	100
<b>Further Information on the Examination(s)</b>				
1.+2. period in summer semester 1. period in winter semester Examiner: Dr. Nazgol Emrani (if Dr. Emrani is absent, Prof. Dr. Christian Jung will examine) Qis: 100201 with number of Examination 100220				

<b>Course Content</b>
The concept of molecular markers to map single genes and QTL Marker assisted selection, DNA isolation PCR and agarose gel electrophoresis Phenotyping a barley DH population for agronomically important traits Molecular and phenotypic marker genotyping Chi-square test to analyze segregation ratios in the DH population Calculating recombination rates manually and by applying the JOINMAP program package
<b>Learning Outcome</b>
This course will give the students the opportunity to learn the concept of molecular markers and genetic linkage through lectures, practical experiments and exercises. During the lecture, the students learn the basics of linkage mapping and the concept and different types of molecular markers. Then they will conduct an experiment in the practical part of the course to detect genetic linkage between molecular markers and loci controlling traits like spikelet or awn characters in barley. The students will isolate DNA from 92 DH lines from Oregon Wolfe Barely population. Then they will genotype the population alongside with parents with molecular markers. Simultaneously, the students will phenotype the DH lines for different spikelet and awn characters. At the end of the course, the students will assess the existence of genetic linkage between the markers and the loci controlling the phenotyped traits using a statistical test (#2 test). In case of genetic linkage, the recombination rate will be calculated. Additionally, the lecturer will provide the students with several examples for calculating the recombination frequency from different segregating populations as additional exercises
<b>Reading List</b>
will be announced at the beginning of the course, Lab protocol, Lecture slides, Scientific literature, Text-books Bernardo R (2010) Breeding for Quantitative Traits in Plants. Second edn. Stemma Press, Woodbury, Minnesota Carena MJ (2009) Handbook of Plant Breeding: Cereals. Springer Science Xu Y (2010) Molecular Plant Breeding. CABI, Oxfordshire, UK

Additional Information
<p>Maximum number of participants: 10 (5 AgriGenomics and 5 Agricultural Science)                      Enrolment by OLAT within workdays Monday Through Friday in the 1st week of the 2. audit period of the preceding semester. Following information is necessary:                      matriculation number                      last name                      first name                      striven degree study                      study program</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>

Use	Compulsory / Optional	Semester
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)	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	-