Georg-August-Universität Göttingen **Module M.iPAB.0013: Selection theory, design and optimisation of breeding programs**	6 C 4 WLH

Learning outcome, core skills: Students are familiar with the theoretical basics of the selection theory even for complex cases (direct and correlated breeding progress, single- and multiple trait selection, multiple-path selection, gene flow method, optimum genetic contribution theory). Students are able to estimate the expected breeding progress for specific cases. They know the basic designs of breeding programs in plant and animal breeding and are able to model, calculate and optimize practical breeding programs by using suitable software programs.	**Workload:** Attendance time: 56 h Self-study time: 124 h

Course: Selection theory, design and optimisation of breeding programs (Lecture and Exercises) *Contents*: Introduction to the selection theory, direct and correlated breeding progress , single- and multiple trait selection , multi-path models , multiple-path selection, gene flow, optimum genetic contribution theory; Explanation of typical breeding program structures in plant and animal breeding, principles of experimental design and optimal allocation of resources, introduction to breeding simulation software (e.g. MoBPS.), impact of selection on allele frequencies (Wright-model) and genetic variance (Bulmer effect), optimization of breeding programs under constraints (eg. conservation of genetic diversity). Literature: Walsh & Lynch: Evolution and Selection of Quantitative Traits	4 WLH
Examination: Written exam (45 minuntes, 50%) and presentation (about 20 minutes, 50%) **Examination requirements:** Profound knowledge of all aspects of the selection theory, application of methods for estimating the breeding progress, assessing the impact of different selection strategies to progress in breeding, inbreeding development and preservation of genetic variance.	6 C

Admission requirements: none	**Recommended previous knowledge:** Good knowledge of quantitative genetics and statistics
Language: English	**Person responsible for module:** Prof. Dr. Timothy Mathes Beissinger
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students:	

30	