

Program of Studies:	Master Program Bioinformatics
Name of the module:	Special-topic Lecture Bioinformatics: Methods for Populations Genetics
Abbreviation:	BI-BM-1
Modules:	Lecture and tutorial
Semester:	1st – 3rd semester master / winter semester
Responsible lecturer:	Prof. Dr. Tobias Marschall
Lecturer:	Prof. Dr. Tobias Marschall
Language:	English
Level of the unit/ Mandatory or not :	Graduate course / mandatory elective
Course type/weekly hours:	Lecture: 2 h (weekly) Tutorial: 1 h (weekly)
Total workload:	150 h = 48 h of classes and 102 h private study
Credits:	5
Entrance requirements:	
Aims/Competences to be developed:	Population Genetics studies the distribution of genetic information across populations under varying conditions. This lecture provides the necessary methods to answer questions such as: Is there evidence for selection pressure on a certain gene? How can ancient migration patterns be retraced based on genetic information? How can quantitative traits such as disease susceptibility be attributed to genetic loci?
Content:	We first cover basic concepts like the Hardy-Weinberg principle, genetic drift, and linkage disequilibrium. Then, we proceed to studying selection and population structure. We will cover haplotype phasing and imputation of missing genotype data as well as the interplay of population genetics and next-generation sequencing. Towards the end of the course, we discuss genome-wide association studies and quantitative traits.
Assessment/Exams:	Oral exam at the beginning of semester break

Literature:	<p>The main source for the course will be the text book Principles of Population Genetics by Hartl and Clark.</p> <p>Furthermore, the following books also cover many of the topics that we will discuss:</p> <ul style="list-style-type: none">• Population Genetics -- A Concise Guide by John Gillespie.• Population Genetics by Matthew Hamilton (eBook available on campus). <p>Lecture slides and supplementary course material will be available on a password protected area.</p>
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