

Population Genetics and Molecular Evolution					
Identification number	Workload	Credit points	Term of studying	Frequency of occurrence	Duration
MN-B-SM (CG 3)	360 h	12 CP	1 st or 2 nd term of studying	Summer term, 1 st half	7 weeks
1	Type of lessons		Contact times	Self-study times	Intended group size*
	a) Lectures		48 h	96 h	max. 12
	b) Practical/Lab		48 h	127 h	max. 12
	c) Seminar		5 h	36 h	max. 12
2	Aims of the module and acquired skills Students who successfully completed this module ... <ul style="list-style-type: none"> • have acquired detailed knowledge on fundamental concepts and theoretical models in population genetics and molecular evolution. • are able to measure, statistically evaluate and interpret genetic data and put these in the context of molecular evolution. • are skilled in the analysis of polymorphism data from natural populations and can independently carry out small scientific projects related to the topic of the module. • have learned how to present research results in oral and written form and to critically discuss scientific publications related to the topic of the module on a professional level. • are able to transfer skills acquired in this module to other fields of biology. 				
3	Contents of the module <ul style="list-style-type: none"> • Principles of population genetics, population genomics and molecular evolution • Statistical tests of genetic data • Mathematical modeling • Intra- and interspecific comparative analyses of genome sequences • Analysis of gene expression data • Work with polymorphism data (VCF file format and VCF-tools) 				
4	Teaching/Learning methods <ul style="list-style-type: none"> • Lectures; Practical/Lab (Project work); Seminar; Computer exercises; Guidance to independent research; Training on presentation techniques in oral and written form 				
5	Requirements for participation Enrollment in the Master´s degree course "Biological Sciences" or in the Master´s degree course "Biochemistry" Additionally recommended: Good mathematical and quantitative skills are highly recommended.				

6	<p>Type of module examinations</p> <p>The final examination consists of three parts: 30 min oral examination about topics of the lectures (50 % of the total module mark), oral presentation (25 % of the total module mark) and seminar paper (weekly, aggregate to 25 % of the total module mark)</p>
7	<p>Requisites for the allocation of credits</p> <p>Regular and active participation; Each examination part at least "sufficient" (see appendix of the examination regulations for details)</p>
8	<p>Compatibility with other Curricula</p> <p>Biological subject module in the Master´s degree course "Biochemistry"</p>
9	<p>Significance of the module mark for the overall grade</p> <p>In the Master´s degree course "Biological Sciences": 15 % of the overall grade (see also appendix of the examination regulations)</p>
10	<p>Module coordinator</p> <p>Prof. Dr. Thomas Wiehe, phone 470-1588, e-mail: twiehe@uni-koeln.de</p>
11	<p>Additional information</p> <p>Subject module of the Master´s degree course "Biological Sciences", Focus of research: (C) Computational Biology; (G) Genetics and Cell Biology</p> <p>Participating faculty: Dr. S. Laurent, Prof. Dr. M. Nothnagel, Dr. D. Valenzano, Prof. Dr. T. Wiehe</p> <p>Literature:</p> <ul style="list-style-type: none"> • Walsh, B., Lynch, M. (2018) Evolution and Selection of Quantitative Traits. Oxford University Press • Hartl, D.L., Clark, A.G. (2007) Principles of Population Genetics. 4th edition, Sinauer. • Hein, J., Schierup M.H., Wiuf, C. (2005) Gene Genealogies, Variation and Evolution. Oxford University Press • Haubold, B., Wiehe, T. (2006) Introduction to Computational Biology. Birkhäuser • Further original papers will be handed out during the module <p>General time schedule: Weeks 1-6 (Mon.-Fri., approx. 4 hours contact time per day): Lectures, practical/lab, writing seminar paper and preparation for the seminar talk held in week 6; Week 7 (Mon.-Fri.): Preparation for the written examination</p> <p>Note: The module contains hand-on laboratory work conducted by small groups of students and is taught in research laboratories. The module contains computer-based practicals/research as a main component.</p> <p>Introduction to the module: April 06, 2020 at 9:15 a.m., Institute for Genetics / Molekulare Biowissenschaften, Computer pool (ground floor)</p> <p>Oral examination: May 22, 2020, second/supplementary examination July 31, 2020; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>

* 11 students from the Master´s degree course "Biological Sciences" and 1 student from the Master´s degree course "Biochemistry".