

Module Name Statistical Genetics and Epidemiology						
Type of Module Advanced Module				Module Code AM-B-SM (CG 2)		
Identification Number	Workload	Credit Points	Term	Offered Every	Start	Duration
MN-B-SM (CG 2)	360 Hours	12 CP	1. – 3. Semester	WiSe, 2nd half	Winter Term Only	7 weeks
1	Course Types		Contact Time	Private Study	Planned Group Size	
	a) Lecture		37 h	74 h	max. 12	
	b) Practical Lab		48 h	171 h	max. 6	
	c) Seminar		6 h	24 h	max. 12	
2	Module Objectives and Skills to be Acquired					
	Students who successfully completed this module ...					
	<ul style="list-style-type: none"> • have acquired detailed knowledge on advanced techniques for obtaining data on genetic variation, concepts of epidemiology (with a particular focus on human genetic epidemiology), and statistical approaches to analyze these data in epidemiological studies. • are able to conduct standard genetic epidemiological analyses, to address potential problems in these studies as well as to interpret their results 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	Module Content					
	<ul style="list-style-type: none"> • Forms of genetic variation used in genetic epidemiology; technologies for obtaining genetic data • Epidemiological study designs, effect measures, genetic risk models • Linkage and association analysis methods for genetic data • Obtaining, imputing, analyzing and annotating next-generation sequencing (NGS) data, including rare variants and structural variation • Analysis of methylation data 					
4	Teaching 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	Prerequisites (for the Module)					
	Formally: none					
	Additional academic requirements:					
	Good knowledge of quantitative methods is indispensable to participate in this module. Good mathematical skills are necessary. Basic knowledge of Linux and R is advantageous, but not mandatory.					
6	Type of examination					
	The final examination consists of three parts: Two hours written examination about topics of the lectures (50 % of the total module mark), oral presentation (25 % of the total module mark) and written seminar paper (weekly, aggregate to 25 % of the total module mark)					

7	<p>Credits Awarded</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>None</p>
9	<p>Proportion of Final Grade</p> <p>12/114</p>
10	<p>Module Coordinator</p> <p>Prof. Dr. Michael Nothnagel, phone 478-96847, e-mail: michael.nothnagel@uni-koeln.de</p>
11	<p>Further Information</p> <p>Participating faculty: Dr. B. Budde, Prof. Dr. M. Nothnagel, Prof. Dr. P. Nürnberg, Prof. Dr. M. Ruth-Schweiger</p> <p>Literature:</p> <ul style="list-style-type: none"> • Laird, N.M., Lange, C. (2011) The Fundamentals of Modern Statistical Genetics. Springer • Bickeböller, H., Fischer, C. (2007) Einführung in die Genetische Epidemiologie. Springer • Further original papers will be handed out during the module <p>General time schedule: Weeks 1-6: Lectures (Mon., Tue., Thu. 2 h each), practical/lab (Mon., Tue., 2 h each, Thu. 4 h), writing seminar paper and preparation for the seminar talk (held in week 6); Week 7 (Mon.-Fri.): Preparation for the written examination. Dates for lectures and exercises may be shifted if agreed on during the module.</p> <p>Note: The module contains hand-on laboratory work conducted individually and is taught in course rooms and research laboratories. The module contains computer-based practicals/research as a main component.</p>