

Module Name Statistical Genetics, Epidemiology and Forensics						
Type of Module ○ Advanced Module				Module Code Statistical Genetics		
Identification Number MN-B-SM (C 3)	Workload 360 h	Credit Points 12 CP	Term 2 nd term of studying	Offered Every Summer term	Start summer term only	Duration 7 weeks
1	Course Types a) Lectures b) Practical/Lab c) Seminar		Contact Time 37 h 48 h 6 h	Private Study 74 h 171 h 24 h	Planned Group Size max. 12 max. 12 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 and forensic settings. • are able to conduct selected genetic epidemiological, epigenetic and forensic 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, epigenetics and forensics • Obtaining genetic data, also including next-generation sequencing (NGS) data • Genetic epidemiological study designs and measures • Linkage and association analysis methods for genetic data, including rare variants • Imputing, analyzing and annotating NGS data • Analysis of methylation data • Analysis of forensic marker data 					
4	Teaching Methods 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) Enrollment in the Master's degree course "Biological Sciences" 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	<p>Type of Examination</p> <p>The final examination consists of two parts: written examination about topics of the lectures (1 hour; 50 % of the total module mark), oral presentation (20-30 min; 50 % of the total module mark)</p>
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 % of the overall grade (see also appendix of the examination regulations)</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>Subject module of the Master's degree course "Biological Sciences", Specialization: (C) Computational Biology</p> <p>Participating faculty: Dr. B. Budde, Prof. Dr. Cornelius Courts, Prof. Dr. M. Nothnagel, 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 • Further information on textbooks and reading material will be listed in ILIAS • 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. 2 h), 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 hands-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> <p>Introduction to the module: May 22, 2023 at 9:15 a.m., Regional Computing Center Cologne (RRZK), Weyertal 121, course room 4 (room no. -1.02); information on changing locations will be sent to your Smail-Account</p> <p>Written examination: July 14, 2023, second/supplementary examination August 25, 2023; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>