Module Name
Population Genetics and Molecular Evolution

Type of Module	**Module Code**
o Advanced Module	Population Genetics

Identification Number	**Workload**	**Credit Points**	**Term**	**Offered Every**	**Start**	**Duration**
MN-B-SM (C 1)	360 h	12 CP	2nd term of studying	Summer term	summer term only	7 weeks

		Contact Time	**Private Study**	**Planned Group Size**
1	**Course Types**			
	a) Lectures	48 h	96 h	max. 16
	b) Practical/Lab	48 h	127 h	max. 16
	c) Seminar	5 h	36 h	max. 16

2 Module Objectives and Skills to be Acquired

Students who successfully completed this module

- 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 Module Content

- Principles of population genetics, population genomics and molecular evolution
- Statistical tests of evolutionary hypotheses
- Mathematical modeling
- Intra- and interspecific comparative analyses of genome sequences
- Analysis of gene variant and expression data
- Work with polymorphism data (e.g., VCF file format and VCF-tools)

4 Teaching Methods

Lectures; Practical; 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

Previous attendance of the lecture module “Computational Biology (C)” is recommended.
Good mathematical and quantitative skills are highly recommended.

6	**Type of Examination** The final examination consists of two parts: oral examination on topics of lectures, seminars and the practical/lab part (20-30 min; 50 % of the total module mark) written report (50 % of the total module mark)
7	**Credits Awarded** Regular and active participation; Each examination part at least "sufficient" (see appendix of the examination regulations for details)
8	**Compatibility with other Curricula** None
9	**Proportion of Final Grade** 15 % of the overall grade (see also appendix of the examination regulations)
10	**Module Coordinator** Prof. Dr. Thomas Wiehe, phone 470-1588, e-mail: twiehe@uni-koeln.de
11	**Further Information** **Subject module** of the Master´s degree course "Biological Sciences", **Specialization:** (C) Computational Biology **Participating faculty**: Dr. A. Fulgione, Dr. S. Laurent, Prof. Dr. M. Nothnagel, , Prof. Dr. T. Wiehe **Literature:** Information about textbooks and other reading material will be given on the ILIAS representation of the course (https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html) **General time schedule:** Weeks 1-6 (Mon, Wed, Fri., approx. 4 hours contact time per day): Lectures, practical/lab, writing seminar paper (= weekly home work exercises) and preparation for the seminar talk held in week 6; Week 7 (Mon.-Fri.): Preparation for the oral examination **Note:** The module contains computer-based practicals/research as a main component. **Introduction to the module:** April 04, 2022 at 9:00 a.m., Center for Molecular Biosciences (COMB), Computer pool (ground floor) or online (in this case, further information/link will be sent to your Smail-Account). **Oral examination:** May 20, 2022, second/supplementary examination August 05, 2022; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.