

<b>Module Name</b> Population Genetics and Molecular Evolution						
<b>Type of Module</b> ○ Advanced Module				<b>Module Code</b> Population Genetics		
<b>Identification Number</b>	<b>Workload</b>	<b>Credit Points</b>	<b>Term</b>	<b>Offered Every</b>	<b>Start</b>	<b>Duration</b>
MN-B-SM (C 1)	360 h	12 CP	2 <sup>nd</sup> term of studying	Summer term, 1 <sup>st</sup> half	Summer term only	7 weeks
<b>1</b>	<b>Course Types</b>		<b>Contact Time</b>		<b>Private Study</b>	
	a) Lectures		48 h		96 h	
	b) Practical/Lab		48 h		127 h	
	c) Seminar		5 h		36 h	
<b>2</b>	<b>Module Objectives and Skills to be Acquired</b> Students who successfully completed this module <ul style="list-style-type: none"> <li>• have acquired detailed knowledge on fundamental concepts and theoretical models in population genetics and molecular evolution.</li> <li>• are able to measure, statistically evaluate and interpret genetic data and put these in the context of molecular evolution.</li> <li>• 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.</li> <li>• 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.</li> <li>• are able to transfer skills acquired in this module to other fields of biology.</li> </ul>					
<b>3</b>	<b>Module Content</b> <ul style="list-style-type: none"> <li>• Principles of population genetics, population genomics and molecular evolution</li> <li>• Statistical tests of evolutionary hypotheses</li> <li>• Mathematical modeling</li> <li>• Intra- and interspecific comparative analyses of genome sequences</li> <li>• Analysis of gene variant and expression data</li> <li>• Work with polymorphism data (e.g., VCF file format and VCF-tools)</li> </ul>					
<b>4</b>	<b>Teaching Methods</b> <ul style="list-style-type: none"> <li>• Lectures; Practical; Seminar; Computer exercises; Guidance to independent research; Training on presentation techniques in oral and written form</li> </ul>					

5	<p><b>Prerequisites (for the Module)</b></p> <p>Enrollment in the Master's of Science degree course "Computational Biology" or in the Master's degree course "Computational Sciences" or "Informatik"</p> <p><b>Additional academic requirements</b></p> <p>Previous attendance of the lecture module Computational Biology; Good mathematical and quantitative skills are highly recommended.</p>
6	<p><b>Type of Examination</b></p> <p>The final examination consists of two parts: Oral examination on topics of lectures, seminars and the practical/lab part (30 min; 50 % of the total module mark) written report (= portfolio, 50 % of the total module mark)</p>
7	<p><b>Credits Awarded</b></p> <p>Regular and active participation; Each examination part at least "sufficient" (see appendix of the examination regulations for details)</p>
8	<p><b>Compatibility with other Curricula</b></p> <p>Optional compulsory module in the Master's degree course "Computational Sciences" or "Informatik"</p>
9	<p><b>Proportion of Final Grade</b></p> <p>12.0 %</p>
10	<p><b>Module Coordinator</b></p> <p>Prof. Dr. Thomas Wiehe, phone 470 1588, e-mail: <a href="mailto:twiehe@uni-koeln.de">twiehe@uni-koeln.de</a></p>
11	<p><b>Further Information</b></p> <p><b>Participating faculty:</b> Dr. A. Fulgione, Prof. Dr. M. Nothnagel, Prof. Dr. T. Wiehe</p> <p><b>Literature:</b></p> <ul style="list-style-type: none"> <li>• Information on recommended text books and other reading material will be given on the ILIAS representation of the course (see <a href="https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html">https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html</a> use general link only?)</li> </ul> <p><b>General time schedule:</b> Weeks 1-6 (Mon., Wed., Fri.): Lectures (9-11), practical/lab (11-13), writing portfolio (= weekly home work exercises); Week 7 (Mon.-Fri.): Preparation for the oral examination</p> <p><b>Note:</b> The module contains computer-based practicals/research as a main component.</p> <p><b>Introduction to the module:</b> April 14th, 2026, 2025 at 9:15 a.m., Center for Molecular Biosciences (COMB), Room 0.46 (ground floor)</p> <p><b>Oral examination:</b> June 03, 2026, second/supplementary examination August 10th or TBA [to be arranged at personal agreement]. More details will be given at the beginning of the module.</p>