

<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>  MN-B-SM (C 1)	<b>Workload</b>  360 h	<b>Credit Points</b>  12 CP	<b>Term</b>  2 <sup>nd</sup> term of studying	<b>Offered Every</b>  Summer term	<b>Start</b>  summer term only	<b>Duration</b>  7 weeks
<b>1</b>	<b>Course Types</b> a) Lectures b) Practical/Lab c) Seminar	<b>Contact Time</b> 48 h 48 h 5 h		<b>Private Study</b> 96 h 127 h 36 h	<b>Planned Group Size</b> max. 16 max. 16 max. 16	
<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> Lectures; Practical; Seminar; Computer exercises; Guidance to independent research; Training on presentation techniques in oral and written form					
<b>5</b>	<b>Prerequisites (for the Module)</b> Enrollment in the Master's degree course "Biological Sciences" <b>Additional academic requirements</b> Previous attendance of the lecture module "Computational Biology (C)" is recommended. Good mathematical and quantitative skills are highly recommended.					

<b>6</b>	<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 (20-30 min; 50 % of the total module mark) written report (=portfolio, 50 % of the total module mark)</p>
<b>7</b>	<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>
<b>8</b>	<p><b>Compatibility with other Curricula</b></p> <p>Elective module in the Master's degree courses "Computational Science" or "Bioinformatik"</p>
<b>9</b>	<p><b>Proportion of Final Grade</b></p> <p>In the Master's degree course "Biological Sciences": 12 % of the overall grade (see also appendix of the examination regulations)</p>
<b>10</b>	<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>
<b>11</b>	<p><b>Further Information</b></p> <p><b>Subject module</b> of the Master's degree course "Biological Sciences", <b>Specialization:</b> (C) Computational Biology</p> <p><b>Participating faculty:</b> Dr. A. Fulgione, Prof. Dr. M. Nothnagel, Prof. Dr. T. Wiehe</p> <p><b>Literature:</b> Information about textbooks and other reading material will be given on the ILIAS representation of the course (<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>)</p> <p><b>General time schedule:</b> 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</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 03, 2023 at 9:00 a.m., Center for Molecular Biosciences (COMB), Computer pool (ground floor)</p> <p><b>Oral examination:</b> May 19, 2023, second/supplementary examination August 04, 2023; dates may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>

\* 12 students from the Master's degree course "Biological Sciences", 3 students from the Master's degree course "Computational Sciences" and 1 student from the Master's degree course "Bioinformatik".