

Module Name Understanding Animal Evolution – genomes, embryos and organisms						
Type of Module ○ Advanced Module				Module Code Animal Evolution		
Identification Number MN-B-SM (G 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 12 h 97 h 30 h	Private Study 30 h 145 h 36 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 developed an understanding of animal and protist evolution and diversity, and how phylogenetic analysis inform our understanding of molecular and morphological evolution in these groups; • have learned about the major concepts of molecular population genetics (nature of molecular variation, neutral theory, methods for detecting natural selection, genomic determinants of variation, molecular clock theories); • have gained hands-on experience in using population genomic computational tools to analyze diversity, demography and linkage of populations and species to understand their evolution; • have gained insight into contemporary topics of evolutionary developmental biology (EvoDevo), and are accustomed to molecular and computational methods in EvoDevo; • have become accustomed with powerful analysis tools on modern Unix based computer systems and will be able to use these systems to assemble genomes and transcriptomes, conduct downstream analyses, and to interpret and document their research; • have gained advanced insights into the handling and exploration of large-scale sequencing data in approaches to tackle the diverse and challenging questions evolutionary research Biologists are facing today; • 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"> • Animal evolution and diversity, genome evolution, evolution of the molecular machinery of development • Protist evolution and diversity, molecular components underpinning protistan feeding strategies and cell-cell interactions • Applications of 2nd and 3rd generation sequencing in EvoDevo-research • Laboratory methods: gene expression visualisation Introduction to computer-based analyses of large-scale omics data					

4	<p>Teaching Methods</p> <p>Lectures; Practical/Lab (Project work); Seminar; Computer exercises; Guidance to independent research; Training on presentation techniques in oral and written form</p>
5	<p>Prerequisites (for the Module)</p> <p>Enrollment in the Master’s degree course “Biological Sciences”</p> <p>Additional academic requirements</p> <p>Basic knowledge of Unix based computer systems will greatly facilitate initial participation, but is not mandatory.</p>
6	<p>Type of Examination</p> <p>The final examination consists of two parts: oral presentation (20-30 min; 50 % of the total module mark), written report (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>15 % of the overall grade (see also appendix of the examination regulations)</p>
10	<p>Module Coordinator</p> <p>Dr. Philipp Schiffer, phone 470-3238, e-mail: p.schiffer@uni-koeln.de</p>
11	<p>Further Information</p> <p>Subject module of the Master’s degree course “Biological Sciences”, Specialization: (G) Molecular and Developmental Genetics</p> <p>Participating faculty: Dr. M. Pechmann, Prof. Dr. S. Roth, Dr. P. Schiffer, Dr. S. Hess, Dr. J. Bast, Dr. T. Hoffmeyer</p> <p>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)</p> <p>General time schedule: Week 1-6 (Mon.-Fri.): Lectures, Practical/Lab (Project work); (daily from approximately 9 a.m. to 5 p.m. including lunch break, times may vary depending on project’s tasks) as well as writing seminar paper and preparation for the seminar talk; Week 7 (Mon.-Thu.): Preparation for the written examination</p> <p>Note: The module contains computer-based practicals/research as a main component.</p> <p>Introduction to the module: April 4, 2022 at 10 a.m., Cologne Biocenter, seminar room 0.024 (first floor) or online (in this case, further information/link will be sent to your Smail-Account); for preparation to the module before this introduction see ILIAS link under literature.</p> <p>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.</p>