

<b>Module Name</b> Time in Biology and Ageing						
<b>Type of Module</b> ○ Advanced Module				<b>Module Code</b> Time in Biology and Ageing		
<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 (A 7)	360 h	12 CP	2 <sup>nd</sup> term of studying	Summer term, 2 <sup>nd</sup> half	Summer term only	7 weeks
<b>1</b>	<b>Course Types</b>		<b>Contact Time</b>		<b>Private Study</b>	
	a) Lectures		20 h		46 h	
	b) Practical/Lab		160 h		100 h	
	c) Seminar with Posters		4 h		30 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 learned mechanisms at the basis of cellular and organismal senescence and ageing</li> <li>• have acquired experimental skills in state-of-the art methods in biochemistry, cell biology, and metabolomics, and can independently carry out small scientific projects related to the topic of the module;</li> <li>• have acquired experimental skills in state-of-the art methods in biochemistry, cell biology, and metabolomics, and can independently carry out small scientific projects related to the topic of the module;</li> <li>• have gained a fundamental understanding of the scientific method and the principles of experimental design;</li> <li>• have learned how to present research results in written form and to critically discuss scientific publications related to the topic of the module on a professional level (poster presentation);</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> In biology, time unfolds differently across scales: for molecules, it is the fleeting moments of chemical interactions and reactions; for cells, it is the rhythm of cycles such as division and repair; and for organisms, it is the broader arc of daily cycles, growth, aging, and mortality. In aging, time becomes the layered convergence of these scales, where molecular wear accumulates, cellular processes slow, and the organism transitions toward decline. <ul style="list-style-type: none"> <li>• Theory: lectures will be centred around the concept of time in different aspects of biology and ageing Lectures will cover: kinetics of protein interactions and activities in cells; metabolic pathways and their adaptation in physiology, pathophysiology and ageing; molecular mechanisms controlling cell cycle progression and cell cycle arrest, leading to cellular senescence; circadian rhythms at cellular and organismal level and how they are affected by ageing; time scale of evolution of genomes; definition of ageing (biological versus chronological) and frailty; basic principles of the scientific method.</li> <li>• Practical methods: the practical part of the course will take place in one of the following laboratories: Dr. A. Stangherlin, Dr. V. Piano, Prof. C. Frezza, Dr. Z. Frentz, Dr. E. Motori, Dr. P. Kreuzaler, Dr. M. Escobar-Henriques, Prof. Dr. K. Ulrich, Dr. D. Trentini, Dr J. Reznick, Dr. G Gatto. Students will carry out small projects related to different aspects of ageing research. More detailed information about the offered projects will be provided before the beginning of the module.</li> </ul>					

4	<p><b>Teaching Methods</b></p> <ul style="list-style-type: none"> <li>Lectures; Practical/Lab (Project work); Seminar; 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>Enrolment in the Master's of Science degree course "Genetics and Biology of Aging and Regeneration" or in the Master's degree course "Biochemistry".</p>
6	<p><b>Type of Examination</b></p> <p>The final examination consists of two parts: an oral examination in the form of a poster session, where students critically discuss a manuscript (20-30 min; 50 % of the total module mark), and a written report on the practical/lab part (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 "Biochemistry"</p>
9	<p><b>Proportion of Final Grade</b></p> <p>12.0 %</p>
10	<p><b>Module Coordinator</b></p> <p>Dr. Alessandra Stangherlin, phone: 022147884256, e-mail: <a href="mailto:alessandra.stangherlin@uni-koeln.de">alessandra.stangherlin@uni-koeln.de</a></p> <p>Dr. Valentina Piano, phone: 022147889523, e-mail: <a href="mailto:valentina.piano@uk-koeln.de">valentina.piano@uk-koeln.de</a></p>
11	<p><b>Further Information</b></p> <p><b>Participating faculty:</b> Dr. A. Stangherlin, Dr. V. Piano, Prof. C. Frezza, Prof. C. Polidori, Dr. Z. Frentz, Prof. M. Lassig, Dr. E. Motori, Dr. P. Kreuzaler, Dr. M. Escobar-Henriques, Dr. D. Trentini, Dr. J. Reznick, Dr. G. Gatto.</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> Week 1: Introduction to Time in Biology and Ageing, lectures, safety lecture and lab projects; Week 2-6: Lectures, lab projects; Week 7: Preparation for the seminar with Poster</p> <p><b>Note:</b> The module contains hands-on laboratory work conducted individually and is taught in research laboratories. The module does not contain computer-based practicals/research as a main component.</p> <p><b>Introduction to the module:</b> June 2, 2026 at 9:00; for preparation to the module before this introduction see ILIAS link under literature.</p> <p><b>Oral examination:</b> July 24, 2026, second/supplementary examination August 28, 2026; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>