Module Name
Functional (Gen)Omics

Type of Module	**Module Code**
o Advanced Module	Functional (Gen)Omics

Identification Number	**Workload**	**Credit Points**	**Term**	**Offered Every**	**Start**	**Duration**
MN-B-SM (A 4)	360 h	12 CP	2nd term of studying	Summer term, 2nd half	Summer term only	7 weeks

1	**Course Types**	**Contact Time**	**Private Study**
	a) Lectures	22 h	54 h
	b) Practical/Lab	150 h	100 h
	c) Seminar	4 h	30 h

2 Module Objectives and Skills to be Acquired

Students who successfully completed this module

- have learned mechanisms of genome regulation in physiology and disease.
- have acquired experimental skills in state-of-the art methods in genomics and epigenomics, transcriptomics and proteomics 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

Using real-life examples from the fields of chromatin biology, epigenetics, gene regulation, DNA repair, protein homeostasis, circadian rhythms and aging the students get introduced to the following omics methodologies:

- ChIP, CLIP, polysome profiling
- Illumina Sequencing, Nanopore sequencing, Sanger sequencing
- DNA microarray
- Genome editing and genetic engineering in different model systems, CRISPR-Cas9
- Genetic screening approaches
- Metabolomics methods
- Proteomics methods
- Machine learning, predicitve modelling, multi-omics data integration
- In addition, the students are introduced to the concept and rules of scientific peer review.

4 Teaching Methods

- Lectures; Practical/Lab (Project work); Seminar; Guidance to independent research; Training on presentation techniques in oral and written form

5	**Prerequisites (for the Module)** Enrollment in the Master's of Science degree course "Genetics and Biology of Aging and Regeneration" or in the Master's degree course "Biochemistry" **Additional academic requirements** Previous attendance of the lecture module Principles of Molecular Genetics, Development and Aging
6	**Type of Examination** The final examination consists of two parts: One hour written examination on topics of lectures and seminars (50 % of the total module mark), oral presentation (20-30 min; 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*** Optional compulsory module in the Master's degree course "Biochemistry"
9	**Proportion of Final Grade** 12.0 %
10	**Module Coordinator** Dr. Stephanie Panier, phone: +49 (0)221 379 70 591, e-mail: panier@age.mpg.de
11	**Further Information** **Participating faculty**: Dr. S. Panier, Dr. H-G. Sprenger, Dr. I. Huppertz, Dr. V. Piano, Dr. J. Reznick, Dr. A. Stangherlin, Dr. P. Antczak, Dr. D. Trentini Schmidt, Dr. Z. Frentz, Dr. A. Annibaldi, Dr. I. Matic **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:** Week 1 (Mon.-Fri.): Introduction to Functional (Gen)Omics (lectures), safety lecture and lab projects; Week 2-6 (Mon.-Fri.): Lectures, seminars and lab projects; Week 7 (Mon.-Fri): Preparation for the written examination **Note:** The module contains hand-on laboratory work conducted individually and is taught in research laboratories. The module does not contain computer-based practicals/research as a main component. **Introduction to the module:** June 1, 2026 at 9:00, MPI Age, Joseph-Stelzmann-Str. 9 b, 50931 Köln, seminar room 1 (ground 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. **Written examination:** 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.