Molecular Mechanisms of Human Diseases					
Identification number	Work-load	Credit points	Term of studying	Frequency of occurence	Duration
MN-BC-BSM-12 (MN-B-SM G 5)	360 h	12 CP	1st or 2nd term of studying	Winter term, 1st half	7 weeks

1	Type of lessons	Contact times	Self-study times	Intended group size*
	a) Lectures	28 h	42 h	max. 12
	b) Practical/Lab	145 h	112 h	max. 3
	c) Seminar	9 h	24 h	max. 2

2 Aims of the module and acquired skills

Students who successfully complete this module will …

- have acquired detailed knowledge on important concepts in modern biomedical research with a focus on key disease mechanisms.
- have acquired experimental skills in state-of-the art methodologies in cell biology and molecular biology 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 biochemistry.

3 Contents of the module

- Mechanisms of human diseases
- Model systems for human diseases
- Genetic control of tissue regeneration and tumor growth
- Basic cell biology – signal transduction in health and disease and molecular mechanisms of pathogenesis
- Genetics in model organisms of human disease
- Eukaryotic cell culture
- DNA analysis by polymerase chain reaction (PCR), quantification of gene expression
- Molecular cloning
- Gel electrophoresis (agarose and PAGE) and western blotting
- Staining methods, immunohistochemistry, microscopy
- Principles of high throughput drug discovery

4 Teaching/Learning methods

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

5 Requirements for participation

Enrollment in the Master´s degree course “Biochemistry” or in the Master´s degree course “Biological Sciences”

6 Type of module examinations

The final examination consists of three parts: Two hours written examination over topics of the lectures (50 % of the total module mark), oral presentation (25 % of the total module mark) and seminar paper (25 % of the total module mark)

7	Requisites for the allocation of credits Regular and active participation; Each examination part at least "sufficient" (see appendix of the examination regulations for details)
8	Compatibility with other Curricula Subject module in the Master´s degree course "Biological Sciences"
9	Significance of the module mark for the overall grade 10 % of the overall grade in the Master's degree course "Biochemistry" (see also appendix of the examination regulations)
10	Module coordinator Prof. Dr. Björn Schumacher, phone 478-84202, e-mail: bjoern.schumacher@uni-koeln.de
11	Additional information Biochemical Subject module of the Master´s degree course "Biochemistry" Participating faculty: PD Dr. F. Bock, Prof. Dr. P. Brinkkötter, Prof. Dr. S. Eming, Dr. R. Jachimowicz, Prof. Dr. F. Klein, Prof. Dr. R. Müller, Prof. Dr. C. Niessen, Prof. Dr. C. Pallasch, Prof. Dr. S. Rosenkranz, PD Dr. Dr. J. Rybniker, PD Dr. H. Schlösser, Prof. Dr. B. Schumacher Literature: • Readings will be provided by the lecturers that cover the key concepts presented in the course and will available on the course website. General time schedule: Week 1-6 (Mon.-Fri.): Lectures, practical/lab, writing seminar paper and preparation for the oral presentation (held at the end of week 6); Week 7 (Mon.-Fri): Preparation for the written examination Note: 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. Introduction to the module: October 07, 2019 at 9 a.m., CECAD Research Centre, Joseph-Stelzmann Str. 26, Lecture hall (ground floor) Written examination: November 22, 2019, second/supplementary examination February 14, 2020; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.

*10 students from the Master´s degree course "Biological Sciences" and 2 students from the Master´s degree course "Biochemistry".