1 The Master's Degree Biochemistry

1.1 Content, Aims of Studies and Requirements

The Master of Science program in Biochemistry is research-oriented and taught in English. The successful completion of the two-year program will lead to a Master of Science (M.Sc.) degree. With the program, students will acquire a strong background in basic biochemistry and in modern life science research practice. This will enable them to take up career paths in both university and company environments. The modules are spread over the main life science areas, including biochemical, biomolecular, and medical research. Students can both extend and specialize their scientific knowledge.

Requirements to participate in the Master's Degree Course Biochemistry are specified in the appendix of the examination regulations.

1.2 Structure and Progression of the Studies

In the first year of the program, students attend an **Advanced Biochemistry and Molecular Medicine Lecture Series** and a **Hot Topics in Biochemistry and Medicine Method Seminar** (both Core Modules/Basismodule) as well as two **Subject Modules** (both Advanced Modules/Aufbaumodule). The latter are 8-week laboratory modules, covering different areas in the life sciences (see Table 3). The second and third term are dedicated to research and comprise two Laboratory Project Modules, Scientific Writing, and the Project Proposal. In the **Laboratory Project Modules** (Specialization Module/Schwerpunktmodul), students work in a research group of their own choice on a scientific question for 12 weeks, to develop a deeper understanding of experimental methods and techniques. The **Scientific Writing** module (Advanced Modules/Aufbaumodul) fosters transferable general writing skills and specific ones for scientific publishing. This prepares students for the **Project Proposal** (Specialization Module/Schwerpunktmodul), where they learn to write an application for funding related to the topic of their future master thesis. The program is completed with a six-month research project that will be written up in a Master's thesis and presented in a colloquium ("**Master Thesis & Defense Module**", (Specialization Module/Schwerpunktmodul)).

1.3 General CP-Survey

Professional Studies		**84 CP** (70%)
Master Thesis		**36 CP** (30%)
Total		**120 CP**

1.4 Term Based Schedule

Term#	Core Modules	Advanced Modules	Specialization Modules		Total CP
1	**Advanced Biochemistry and Molecular Medicine** (whole term, 6 CP)	**Subject Module 1***, ** (12 CP) **Subject Module 2***, ** (12 CP)			30
2	**Hot Topics in Biochemistry and Medicine** (workshop, 6 CP)	**Scientific Writing** (workshop, 6 CP)	**Laboratory Project Module 1***** (18 CP)		30
3			**Laboratory Project Module 2***** (18 CP) **Project Proposal******** (6 CP)		24
4				**Master Thesis & Defense** (36 CP)	36

* One **Subject Module** has to be completed before the first Laboratory Project Module can be performed
** One **Subject Module** has to have a biochemical focus **(MN-BC-BSM)** the other can have a more general focus **(MN-BC-GSM)**
***Laboratory Project Modules** have to be performed in different research groups.
**** The supervisor of the **Project Proposal** has to be the supervisor of the master thesis.
# As students are admitted in fall and spring, the order in term 1 and 2 can vary.

1.5 Calculation of the Overall Grade

10%	Advanced Biochemistry and Molecular Medicine
5%	Hot Topics in Biochemistry and Medicine
5%	Scientific Writing
10%	Subject Module 1
10%	Subject Module 2
10%	Laboratory Project Module 1
10%	Laboratory Project Module 2
5%	Project Proposal
35%	Master Thesis & Defense
100%	**Total**

2 Module Descriptions

The study program contains **nine modules**.
The study program is initiated with two core modules that define the common knowledge base of Biochemistry students. In the **Advanced Biochemistry and Molecular Medicine** lecture series, researchers from both biochemistry and molecular medicine present core knowledge combined with cutting edge research. The **Hot Topics in Biochemistry and Medicine** reviews core life science methods and techniques and their application in modern research.
Students have to successfully complete two **Subject Modules**, preferably in the 1st and 2nd term (Table 2). The Subject Modules aim to extend the knowledge in the respective research area with 8-week laboratory and theoretical training. Simultaneously, the students extend their skills of presenting scientific results in oral and written form. To better achieve these competencies, the subject modules contain two to three examination elements. The **Scientific Writing** module aims to bolster a necessary transfer skill. It is well placed to support the writing necessary in subsequent modules.
The **Laboratory Projects** in the 2nd and 3rd term of the Master's degree course will help students learn how to actively integrate into a research group and extend their practical skills by means of a laboratory project of 12 weeks. A student may not perform both Project Modules in the same research group to ensure the broadest possible education. In the module **Project Proposal** students will write an application for funding closely related to the topic of their future master thesis. This is both a good test run for later applications and helps with the preparation of the module Master Thesis & Defense.
The Master Thesis is an integrative part of the module **Master Thesis & Defense**. Further information and regulations can be found in the module description as well as in the examination regulations of the Master's degree course.

The following tables give an overview of available modules. Detailed descriptions are listed afterwards.

2.1 **Overview of module types**

The programme consists of nine modules with 12-14 examination elements (+ 2 examination elements for the Master thesis & Defence). For each module all exam elements have to be passed to pass the overall module.

Name	Duration	Examination type* Module type**	Credits
Advanced Biochemistry and Molecular Medicine, MN-BC-BCMM	winter term	1 exam element, P	6
Hot Topics in Biochemistry and Medicine, MN-BC-HT	summer term	1 exam element, P	6
Subject Module 1 & 2 MN-BC-BSM or MN-BC-GSM	8 weeks	2 or 3 exam elements, WP	24 (12+12)
Scientific Writing MN-BC-SW	workshop	1 exam element, P	6
Laboratory Project Module 1 & 2 MN-BC-PM	3 months	2 exam elements, P	36 (18+18)
Project proposal MN-BC-PP	5 weeks	1 exam element, P	6
Master Thesis & Defense MN-BC-MT	6 months	2 exam elements, P	36

* The proportional weighting of the individual examination elements for the total module grade is outlined in the module descriptions (No. 6).
** Module type is either P, obligatory (Pflicht) or WP, facultative obligatory (Wahlpflicht)

2.2 **Available Module Places**

Subject Module Name (ID)	Lecturer	Available Places (subject to change)			
		Winter		Summer	
		1st	2nd	1st	2nd
Medical Biochemistry – Enzymes, Metabolites and Diseases, MN-BC-BSM01	Schwarz (BC)	10			
Molecular concepts of human diseases, MN-BC-BSM02	Brachvogel (Med)	8			
Epigenetics, MN-BC-BSM03	Schwaiger (Med)	8			
Metabolic Reprogramming in Health and Disease, MN-BC-BSM04	Trifunovic (Med)		10		
Introduction to protein crystallography, MN-BC-BSM05	Baumann (BC)		8		
Analysis of protein structures and protein-ligand interactions, MN-BC-BSM06	Baumann (BC)			8	
3D Cryo Electron Microscopy, MN-BC-BSM07	Behrmann (BC)			9	
Neurobiochemistry, MN-BC-BSM08	Schwarz (BC)			8	
Mitochondria and Neurodegeneration, MN-BC-BSM09	Rugarli (BC)			1	
Posttranslational Regulation of Proteins, MN-BC-BSM10	Hofmann (Bio)			2	
Molecular Genetics, MN-BC-BSM11	Gehring (Bio)			2	
Advanced Light Microscopy, MN-BC-GSM01	Schauss (Bio)			1	
Molecular Mechanisms of Human Disease, MN-BC-GSM02	Schumacher (Med)			2	
Mitochondrial Proteins – Biogenesis, Networks and Functional Decline, MN-BC-BSM12	Riemer (BC)				8
Peptide Biochemistry, MN-BC-BSM13	Neundorf (BC)				4
Functional Genomics, MN-BC-GSM03	Graef (MPI)				2
Cell Death in Inflammation, Immunity and Disease, MN-BC-GSM04	Corona (Bio)				2
Molecular Human Genetics, MN-BC-GSM05	Wirth (Med)				4
Advanced Bioinformatics, MN-BC-GSM06	Beyer (Bio)				1

BC - Faculty of Mathematics and Natural Sciences: Institute of Biochemistry, Dep. of Chemistry
Bio - Faculty of Mathematics and Natural Sciences: Dep. of Biology
Med - Medical Faculty: Institute for Biochemistry