



Course Plan Recommendation for the international Master of Science (M.Sc.) degree program in **Medical Informatics**

The **M.Sc.** degree program in **Medical Informatics** trains IT experts in the interdisciplinary science of the systematic acquisition, administration, storage, processing and provision of data, information and knowledge in medicine and healthcare. You will obtain skills and qualifications by applying principles, concepts and methods of computer science as well as of human medicine and natural sciences.

This **course plan** guides Master's students in Medical Informatics by providing additional explanations to the exam regulations currently in place and recommending courses in each respective semester. Course Plan Examples in this document consist of compulsory modules and related areas that can be combined freely. We encourage our students to **design their own course of study** that best suits their individual interests.

For **further information** regarding your studies and exams, please

- refer to the Computer Science Department's [Downloads](#) section;
- check the [FAQ Medical Informatics Master](#) site;
- review the course database (e.g. [Studies offered](#) via alma) for individual prerequisites;
- or visit our [Methods in Medical Informatics Chair's site](#).

Admission requirements:

- Bachelor's degree **grade 2,5** or higher in Medical Informatics (or comparable, e.g. bioinformatics, computational biology, computer science, human medical sciences);
- **English** skills: [CEFR](#) Level **B2** or equivalent
- **German** skills: [CEFR](#) Level **C1** or equivalent, except with at least a Bachelor's degree in Medical Informatics or a comparable field

This document outlines 3 possible course plans depending on the required pre-qualification (Bachelor's degree):

- [Profile A](#): for students with a Bachelor's degree in **Medical Informatics** or a comparable field
- [Profile B](#): for students with a Bachelor's degree in **Medical Sciences** or a comparable field
- [Profile C](#): for students with a Bachelor's degree in **Computer Science** or a comparable field

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Overview M.Sc. degree program in Medical Informatics						
Module / Study Area:		Recommended Semester(s)	ECTS (Profile A)	ECTS (Profile B)	ECTS (Profile C)	Remarks
MEDZ-MEDINFO	Advanced Medical Informatics	1-3	9	9	9	
MEDZ-BIOINFO	Advanced Bioinformatics	1-3	9	9	9	Eligible between Structure and Systems Bioinformatics or Sequence Bioinformatics
MEDZ-BIOMED	Biomedical Informatics	1-3	24	15	15	Eligible courses from Medical Informatics, Bioinformatics
INFO-INFO	Computer Science	1-3	18	12	12	Eligible courses from Computer Science
MEDZ-MEDTECH	Medicine–Medical Technology	1-3	18	9	18	Eligible courses from medicine and application-focused medical technology courses
MEDZ-RES	Research Project	1-3	9	9	9	In case of insufficient instructor capacity or student's personal preference, this can be replaced by any 9 ECTS course eligible for MEDZ-BIOINFO or MEDZ-BIOMED
MEDZ-SEM	Medical Informatics Seminar	1-3	3	3	3	MSc Medical Informatics seminar, alternatively any seminar from MSc Bioinformatics, MSc Computer Science
MEDZ-INFO	Foundations of Biomedical Informatics	1-3	0	24	0	Courses for students with little/no Computer Science background
MEDZ-BASICMEDINFO	Foundations of Medicine and Bioinformatics	1-3	0	0	15	Courses for students with little/no medical/life science background
MASTER	Master's Thesis and Presentation	4	30	30	30	Thesis 27 ECTS + Presentation 3 ECTS
Total ECTS:			120	120	120	

Course Plan Recommendation for the M.Sc. degree program in Medical Informatics
Profile A: for students with a Bachelor's degree in **Medical Informatics** (or comparable)

Course Plan Example			
Profile A			
Semester			
1	2	3	4
Advanced Medical Informatics (9 ECTS)	Applicable pre-selection: (6 ECTS) • Structure-Based Drug Design • Cheminformatics	Applicable pre-selection: (3 ECTS) • Machine Learning to Fight Infections • Machine Learning in Biomedicine	Master Thesis (27 ECTS)
		Computational Proteomics and Metabolomics (6 ECTS)	
	Bioimaging (3 ECTS)		
Medical Data Science (6 ECTS)	Nanoanalytics (3 ECTS)	Applicable pre-selection: (2 x 6 ECTS) • Machine Learning for Single-Cell Dynamics • Introduction to Cryptography • Tabular Database Systems • C++ Programming • Public Cloud Computing or any other INFO-INFO course	
Applicable pre-selection: (6 ECTS) • Machine Learning for Single-Cell Dynamics • Introduction to Cryptography • Tabular Database Systems • C++ Programming or any other INFO-INFO course	Sequence Bioinformatics (9 ECTS)		
Biorobotics (6 ECTS)	Research Project in Medical Informatics (or any 9 ECTS course eligible for MEDZ-BIOINFO or MEDZ-BIOMED) (9 ECTS)	Structure and Systems Bioinformatics (9 ECTS)	
Applicable pre-selection: (3 ECTS) • Machine Learning to Fight Infections • Machine Learning in Biomedicine			Master Thesis Presentation (3 ECTS)
Total: 30 ECTS	Total: 30 ECTS	Total: 30 ECTS	Total: 30 ECTS

**Course Plan Recommendation for the M.Sc. degree program in Medical Informatics,
Profile B: for students with a Bachelor's degree in **Medical Sciences** (or comparable)**

Course Plan Example Profile B			
Semester			
1	2	3	4
Computational Workflows for Biomedical Data (3 ECTS)	Introduction to Statistical Machine Learning (6 ECTS)	Structure and Systems Bioinformatics (9 ECTS)	Master Thesis (27 ECTS)
Applicable pre-selection: (6 ECTS) - Machine Learning for Single-Cell Dynamics - Introduction to Cryptography - Tabular Database Systems - C++ Programming or any other INFO-INFO course			
Advanced Medical Informatics (9 ECTS)	Bioimaging (3 ECTS)	Research Project in Medical Informatics (or any 9 ECTS course eligible for MEDZ-BIOINFO or MEDZ-BIOMED) (9 ECTS)	
	Machine Learning for Single Cell Biology (6 ECTS)		
Biorobotics (6 ECTS)	Introduction to Data Structures and Programming for Life Scientists (9 ECTS)	Machine Learning to Fight Infections (3 ECTS)	
Applicable pre-selection: (6 ECTS) - Machine Learning for Single-Cell Dynamics - Introduction to Cryptography - Tabular Database Systems - C++ Programming or any other INFO-INFO course		Medical Data Science (6 ECTS)	
Total: 30 ECTS	Total: 30 ECTS	Total: 30 ECTS	
			Total: 30 ECTS

**Course Plan Recommendation for the M.Sc. degree program in Medical Informatics,
Profile C: for students with a Bachelor's degree in **Computer Science** (or comparable)**

Course Plan Example Profile C			
Semester			
1	2	3	4
Advanced Medical Informatics (9 ECTS)	Nanoanalytics (3 ECTS)	Machine Learning for Single Cell Dynamics (6 ECTS)	Master Thesis (27 ECTS)
	Humanbiologie 1 (6 ECTS)		
Einführung in die Immunologie (3 ECTS)	Medizinische Terminologie (3 ECTS)	Research Project in Medical Informatics (or any 9 ECTS course eligible for MEDZ-BIOINFO or MEDZ-BIOMED) (9 ECTS)	
Medical Data Science (6 ECTS)	Bioimaging (3 ECTS)		
	Advanced Immunology (3 ECTS)	Biorobotics (6 ECTS)	
Applicable pre-selection: (6 ECTS) - Machine Learning for Single-Cell Dynamics - Introduction to Cryptography - Tabular Database Systems - C++ Programming or any other INFO-INFO course	Applicable pre-selection: (6 ECTS) - Data Literacy - Advanced SQL - Deep Learning - Network Security I + II (6+6 ECTS) - C++ Programming or any other INFO-INFO course		
Applied Statistics for Biomedical Data Analysis (3 ECTS)	Machine Learning for Single-Cell Biology (6 ECTS)	Structure and Systems Bioinformatics (9 ECTS)	
Computational Workflows for Biomedical Data (3 ECTS)			
Total: 30 ECTS	Total: 30 ECTS	Total: 30 ECTS	Master Thesis Presentation (3 ECTS)
Total: 30 ECTS			