



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)	Structure-Based Drug Design (6 ECTS)	Machine Learning for Health (3 ECTS)	Master Thesis (27 ECTS)
	Biorobotics (6 ECTS)	Applicable pre-selection: (6 ECTS) <ul style="list-style-type: none"> • Biomedical Data Literacy • Advanced SQL • Deep Learning • C++-Programming • Reinforcement Learning 	
Applicable pre-selection: (6 ECTS) <ul style="list-style-type: none"> • Advances in Computational Transcriptomics • Cheminformatics • Machine Learning for Single Cell Biology 		Sequence Bioinformatics (9 ECTS)	
Applicable pre-selection: (2 x 6 ECTS) <ul style="list-style-type: none"> • Biomedical Data Literacy • Advanced SQL • Deep Learning • C++-Programming • Reinforcement Learning • Network Security I & II (6+6) 	Structure and Systems Bioinformatics (9 ECTS)	Nanoanalytics / Interfaces (3 ECTS)	
	Medical Data Science (6 ECTS)	Research Project in Medical Informatics (or any 9 ECTS course eligible for MEDZ-BIOINFO or MEDZ-BIOMED) (9 ECTS)	
Bioimaging (3 ECTS)	Applicable pre-selection: (3 ECTS) <ul style="list-style-type: none"> • 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
Introduction to Data Structures and Programming for Life Scientists (9 ECTS)	Tabular Database Systems (6 ECTS)	Machine Learning for Single Cell Biology (6 ECTS)	Master Thesis (27 ECTS)
	Medical Data Science (6 ECTS)	Bioimaging (3 ECTS)	
Advanced Medical Informatics (9 ECTS)		Computational Workflows for Biomedical Data (3 ECTS)	
	Biorobotics (6 ECTS)	Practical Time Series Analysis in Medicine and Biology with Python (3 ECTS)	
Applicable pre-selection: (2 x 6 ECTS) • Biomedical Data Literacy • Introduction to Statistical Machine Learning for Bioinformaticians and Medical Informaticians • Angewandte Statistik I • Bildverarbeitung		Structure and Systems Bioinformatics (9 ECTS)	
	Applicable pre-selection: (6 ECTS) • Advanced SQL • Deep Learning • Data Literacy • C++-Programming • Reinforcement Learning		
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)	Einführung in die Immunologie (3 ECTS)	Applicable pre-selection: (6 ECTS) <ul style="list-style-type: none">Machine Learning for Single Cell BiologyAdvances in Computational TranscriptomicsCheminformatics	Master Thesis (27 ECTS)
	Biorobotics (6 ECTS)		
Nanoanalytics / Interfaces (3 ECTS)	Structure and Systems Bioinformatics (9 ECTS)	Research Project in Medical Informatics (or any 9 ECTS course eligible for MEDZ-BIOINFO or MEDZ-BIOMED) (9 ECTS)	
Applicable pre-selection: (6 ECTS) <ul style="list-style-type: none">Humanbiologie IMedical Visualization		Machine Learning for Health (3 ECTS)	
Data Literacy (6 ECTS)	Medical Data Science (6 ECTS)	Secure Processing of Medical Data: Privacy-enhancing Technologies in Practice (3 ECTS)	
Bioimaging (3 ECTS)		Advanced Immunology (3 ECTS)	
Medizinische Terminologie (3 ECTS)	Structure-Based Drug Design (6 ECTS)	Applicable pre-selection: (6 ECTS) <ul style="list-style-type: none">Advanced SQLDeep LearningC++-ProgrammingReinforcement Learning	Master Thesis Presentation (3 ECTS)
Total: 30 ECTS	Total: 30 ECTS	Total: 30 ECTS	Total: 30 ECTS