

Module Handbook

Heidelberg University Medical Faculty Mannheim Master of Science “Translational Medical Research”

Period of Study: Two semesters full time; yearly intake (winter term)

Type of Study: consecutive; research oriented

Start: Sept. 2009/2010

Areas of Study: Molecular Biology; Clinical Research

Location: Medical Faculty Mannheim/ UMM

ECTS-credits: 60

Modules: 4 teaching modules plus a research/thesis module

Target Group: Graduates in health sciences/life sciences with 1st degree equivalent to 240 ECTS

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Quality objectives and overview

1. Preamble: Qualification objectives at Heidelberg University

In accordance with its mission statement and constitution, Heidelberg University's degree courses have subject-related, transdisciplinary and occupational objectives. They aim to provide a comprehensive academic education equipping graduates for the world of work.

Consequently, the following competence profile shall be included in module handbooks as a profile of skills valid for all disciplines. It shall be applied to the specific objectives of the individual courses and then implemented in their curricula and modules.

The main points of the competence profile are the following:

- developing subject-related skills with a pronounced research orientation
- developing the ability to engage in transdisciplinary dialogue
- developing practice-related problem-solving skills
- developing personal and social skills
- promoting the willingness to assume social responsibility on the basis of the skills acquired

2. Qualification objectives of the Master of Science programme Translational Medical Research

Major aims of translational medical research are to translate knowledge, mechanisms, and techniques of basic molecular and cellular research into new approaches for diagnosis and therapy of disease, and also to translate clinical observations back to the laboratory, and back to basic research questions.

Therefore, this Master programme aims to build an interface between experimental basic science, particular methods and models to translate it, and clinical medicine. It trains students with a first university degree (e.g. BSc or medical degree) in the interdisciplinary field of translational medical research between research laboratory and clinics. The MSc Translational Medical Research programme's subject-related and transdisciplinary qualification objectives are closely interrelated.

Subject-related qualification objectives

Graduates of the MSc in Translational Medical Research (TMR)

- are up-to-date with the latest research in the fields of molecular and cellular biology of medical disorders.
- have an understanding of disease processes on the molecular and cellular level
- have a good overview of clinical study design, drug development as well as ethical issues and formalities regarding research.
- have a good overview of the cutting-edge methods and current problems in diagnosis and therapy of medical disorders
- have an understanding of the players involved in the translational process, as well as the translation towards industry

- can apply their thorough knowledge about the principles of translational research techniques to a broad range of medical questions.

They have acquired the ability to

- write a review article, create a research proposal and evaluate proposals from others.
- present and defend their research orally with a variety of different media
- independently formulate research projects in translational medicine, including identifying the research question, the methodology for its solution, and the impact of the results at a practice and policy level.
- autonomously work on a specific research project in a laboratory or clinical setting and participate actively in lab routines such as journal clubs, progress reports and academic discussion.

In all of the above topics students have a deepened knowledge in the areas from which they have chosen practical courses.

MSc TMR graduates have a clear appreciation of the interdisciplinary action needed and the competence to communicate in such a way as to bridge the gap between basic science and clinical research, diagnosis and therapy.

Trans- and Multidisciplinary qualification objectives

Graduates of the MSc in Translational Medical Research (TMR) have the ability to:

- Acquire knowledge independently and apply this knowledge in practical situations
- Seek, process and critically analyze information from different sources in order to develop innovative and creative solutions to research problems
- Write research proposals and review articles that demonstrate independent thinking
- Communicate questions and findings with others in their field as well as in an interdisciplinary setting using a variety of media
- Select the relevant practical tools to answer research questions and work with these tools in a collaborative setting
- Design and manage projects
- Work in an international, multi-cultural and multi-disciplinary team, actively participating in discussion
- Provide, accept and consider constructive criticism

Graduates have also gained awareness of relevant international health issues and have developed an overview of the key players involved in the global field of health.

3. Possible career options

There are a broad and high range of employment opportunities in academia and industry for the students successfully completing the translational medical research programme. Progress in diagnosis and therapy in medicine, in particular concerning diseases such as cancer, vascular disorders, or nervous system disorders, are no longer achievable without the competent integration of know-how and knowledge at the levels of molecular biology, systems biology and clinical pathophysiology. Additionally, when it comes to developing a new diagnostic tool or therapeutic from the bench to the clinical application, the students

graduating from the MSc in Translational Medical Research programme will have decisive advantages over students qualified in classical study tracks such as biology, engineering or medicine. Therefore our graduates have good perspectives both in academia as well as in industry. They are well-prepared to continue with an MD or PhD programme in a basic or applied research or clinical setting. Qualified researchers with at least a Masters degree are also needed in other areas e.g. for validation of translational safety biomarkers, surrogate markers for vascular endpoints, pain research, new tools for the development of novel therapies in psychiatric disorders and neurodegenerative diseases etc.

Examples for employers in academia include Universities, biomedical research organizations such as those found in the Helmholtz Gemeinschaft, Blaue Liste institutions and Max-Planck institutes. Examples in the pharmaceutical industry include Bayer Schering, Merck, Roche, Sanofi Aventis, Novartis and many more. Similar openings are available to TMR graduates in academic and industrial research organizations abroad.

4. The International Master in Innovative Medicine

A small number of students from the EACEA-supported Erasmus Mundus Joint Master Degree “International Master in Innovative Medicine” (IMIM) study the two semesters of the TMR programme as their first two semesters of a 120 ECTS (four semester) international masters programme. After relocating to Uppsala Universitet (Sweden) or Rijksuniversiteit Groningen (The Netherlands) for semesters three and four and finishing their master thesis work and master thesis, they will receive a double degree from the respective universities that they studied at. This track is only open to students who have applied for and have been accepted to the international programme “IMIM” at the main partner, Rijksuniversiteit Groningen. For details of IMIM, please see <https://www.innovativemedicine.eu/> and the specific handbooks of this study programme. Differences in the study tracks are detailed below.

Overview of the programme

The Master course „Translational Medical Research” is divided into 4 modules which follow the idea from “bench to bedside and back” during semester one: Module 1 conveys the basis of medical disorders and disease processes at the molecular and cellular level. In Module 2 students acquire knowledge about current methods and challenges in the clinical diagnosis and treatment of disease, as well as current research approaches in these areas. Module 3 comprises an individual laboratory project. Module 4 focuses specifically on translational medicine. In each of the more theoretical modules 1, 2 and 4 students can choose one practical course in which they become acquainted with the practical aspects of molecular oncology, neurobiology, vascular medicine or other topics. In semester two students follow the final Module 5 which contains a research project, its summarization in written form and its final presentation and evaluation. For the TMR students the research project must be prepared as a written master thesis and the final presentation and defence takes place in form of the final master thesis exam. In contrast to the students studying TMR only, the students incorporated from the Erasmus Mundus Joint Master Degree Programme “International Master in Innovative Medicine” (IMIM) will summarize their semester two research work in a written report or paper, which will also be presented orally similar to the TMR master thesis work.

Module	Title	Course	Title	ECTS
1	The biological basis of disease	1.1	Scientific key competences	7
		1.2	Advanced laboratory methods	
		1.3	Cellular and molecular basis of disease processes	
		1.4	Disease processes lab	
		1.5	Biostatistics 1	
2	Diagnosis and clinical treatment	2.1	State of the art, cutting edge research and current challenges in diagnosis and clinical treatment	6
		2.2	Diagnosis and clinical treatment lab	
		2.3	Clinical studies and biostatistics 2	
3*	Research in practice	3.1	Individual laboratory research project	6
		3.2	Research proposal project	4
4	Translation in lab and clinics	4.1	Case studies	7
		4.2	Infrastructure for translational research	
		4.3	Drug development	
		4.4	Translation lab	
		4.5	Industry and innovation	
5	Research project/Master thesis		Research project with written and oral presentation	30
Total				60

*Total ECTS for module 3 = 10

Module Number Module 1	Module Title The biological basis of disease		ECTS Credits 7
	Student Investment Time (SIT) 240 hours		Module Offered Annually in September/October Duration Five weeks
	Lectures, seminars, workshops & tutorials	90	
	Practical courses	50	
	Self-study	100	
	Lectures, workshops, presentations, tutorials and a practical laboratory course to provide theoretical and methodological foundations. Self-study time includes the time required to prepare for and complete all module assessments and to write an essay in the form of a review article.		
Topics Covered/ Courses	<u>Compulsory courses:</u>		
	1.1 Scientific key competences:		
	<ul style="list-style-type: none">• Literature research, critical paper reading and scientific ethics• Presentation skills workshop• Review writing¹		
	1.2 Advanced laboratory methods:		
	<ul style="list-style-type: none">• Hands-on lab course in which students learn and practice laboratory methods and write protocols about them.		
	1.3 Cellular and molecular basis of disease processes		
	<ul style="list-style-type: none">• The course provides an overview of general disease processes. The main focus is on the identification and understanding of alterations in biological pathways and processes responsible for a certain disorder as well as on biological pathways associated with certain diseases.		
	1.4 Disease processes lab (compulsory elective course)		
	<ul style="list-style-type: none">• Laboratory course in small groups: students choose from a variety of topics from molecular oncology, neurobiology, vascular medicine and others		
	1.5 Biostatistics 1		
	<ul style="list-style-type: none">• Statistical methods specific for laboratory research. Tutorials will provide the necessary practical support for the students as they begin to use the various statistical methods. Topics include statistical analysis, processing of selected examples with SAS, , demonstration of examples via e-learning		
	¹ Review writing: The course provides students with an opportunity to perform literature research around a timely topic in translational research, then to write an extended essay in the form of a referenced review article (length around 3000 words). The essay should give an overview of the field in question, but also give more detail about research results in a subsection of the field. The experimental evidence supporting important conclusions should be discussed. <i>The essays will be judged according to the following scheme:</i> Presentation and organization of the essay (including use of figures), understanding of the subject, completeness of the overview, detail and discussion of experimental evidence, use of literature, analysis of what the literature means/open questions remaining to be answered.		

Learning Outcomes	<p><u>On completing the module students:</u></p> <ol style="list-style-type: none"> (1) Understand the basis of good scientific practice and ethics (2) Independently research and critically evaluate scientific literature (3) Autonomously write a scientific review article (4) Deliver oral presentations independently with a variety of media (5) Understand and reproduce the basis and functions as well as the latest research of disease-relevant molecular and cellular biology (6) Understand the cellular and molecular basis of disease processes. (7) Identify and analyse the possible cellular or molecular reason for a certain disease, and summarize and present their conclusions in small teams. (8) Similarly, identify and analyse the possible diseases that can arise from a molecular or cellular malfunction, and summarize and present their conclusions in small teams. (9) Handle basic molecular laboratory techniques. (10) Decide what should be included in a laboratory protocol and formulate such a protocol independently. (11) Determine which laboratory methods should be used for a certain research question related to the biological basis of disease and apply them in a laboratory setting of their choice from one of the Medical Faculty's foci. (12) Choose the appropriate biostatistical method for a laboratory experiment, apply it and interpret the result
Prerequisites	<ul style="list-style-type: none"> • Basic laboratory skills • Basic principles of molecular biology and biochemistry and basic principles of clinical medicine • Basics of literature research, critical paper reading and writing
Useful Prior Knowledge	See above
Assessment Methods	Students' achievement of the learning outcomes of the module will be assessed through a combination of: extended essay grade, assessment of laboratory protocols for the practical course 1.2, colloquia for other courses and examinations of theoretical content in the exam weeks at the end of module 3.
Registration Requirements	Enrolment in the M.Sc. programme Translational Medical Research
Module classification	To be taken in semester one of TMR, prerequisite for Module 2

Module Number Module 2	Module Title Diagnosis and clinical treatment		ECTS Credits 6
	Student Investment Time (SIT) 240 hours		Module Offered Annually in October/November Duration 4 weeks
	Lectures, seminars & tutorials	90	
	Practical courses	20	
	Self-study	130	
	Teaching-Learning Activities (TLA) Lectures, seminars and tutorials provide theoretical and methodological foundations; practical courses teach experimental approaches. Self-study time includes the time required to prepare for and complete all course assessments.		
Topics Covered/ Courses	<u>Compulsory courses:</u> 2.1 State of the art, cutting edge research and current challenges in diagnosis and clinical treatment e.g. from the fields of pathology, clinical chemistry, imaging, pharmacology, surgery, radiotherapy and psychotherapy. 2.2 Diagnosis and clinical treatment lab (compulsory elective course) Laboratory course in small groups: students choose from a variety of topics from molecular oncology, neurobiology, vascular medicine and others 2.3 Clinical studies and biostatistics 2: The course focuses on the design and background of clinical studies and relevant statistical methods. Tutorials will provide the necessary practical support for the students as they begin to use the various statistical methods. Demonstration of examples via e-learning		
Learning Outcomes	<u>On completing the module students:</u> (1) Understand the state of the art of and explain current challenges in diagnosis and therapy in molecular pathology, clinical chemistry, imaging, pharmacology, surgery, radiotherapy, psychotherapy and other fields. (2) Reproduce and understand selected examples of practical methods in clinical research, diagnosis and therapy, such as the basic principles and physics behind imaging techniques such as PET, CT and MRI, as well as interpret their results from the data and understand how they are used in the clinical setting. (3) Be able to design in theory a clinical trial, understand and explain how clinical trials are executed and which national and international bodies are involved in the process. (4) Have obtained first experience of writing an own ethics committee proposal in small teams. (5) Choose the appropriate biostatistical method for a clinical study, apply it and interpret the result (6) Determine which laboratory methods should be used for a certain research question related to diagnosis and/or therapy and apply them in a laboratory or clinical setting of their choice from one of the Medical Faculty's foci.		
Prerequisites	• Participation in Module 1		
Useful Prior Knowledge	• Cellular and molecular basis of diseases, scientific key competences, biostatistics 1		
Assessment Methods	Students' achievement of the learning outcomes of the module will be assessed through a combination of colloquia, grading of ethics committee proposal and examinations of theoretical content in the exam weeks at the end of module 3.		
Registration Requirements	Enrolment in the M.Sc. programme Translational Medical Research		
Module classification	To be taken in semester one of TMR, prerequisite for Module 3		

Module Number Module 3	Module Title Research in practice		ECTS Credits 10
	Student Investment Time (SIT) 300 hours		Teaching-Learning Activities (TLA)
	Lectures, seminars, workshops & tutorials	10	Individual practical project to experience hands-on experience in the laboratory supplemented with theoretical background. Individual research proposal-writing and -reviewing project. Self-study time includes the time required to prepare for and complete all course assessments.
	Practical courses	20	
	Self-study	270	
Topics Covered/ Courses	<u>Compulsory courses:</u>		
	3.1 Individual laboratory research project (6 ECTS) Over a five-week period each student will be embedded in a research laboratory and will undertake a project of relevance to the ongoing work in that laboratory. Results will be presented with different methods		
	3.2 Research proposal project (4 ECTS) In course 3.2, project planning, research proposal writing and evaluation, over a 14-week period, the students will have to carry out the following tasks in a long-term project that will develop a variety of soft skills:		
	(i) define a meaningful interdisciplinary translational research health problem (ii) discuss the research problem with an interdisciplinary team (iii) write a research proposal to address the identified health problem (iv) review the completed research applications of other students (v) improve the research proposal taking the review into account and write a rebuttal to the review		
	These tasks will be supported by lectures and tutorials. At the beginning of the programme students have been presented with documentation about the research interests of potential future thesis supervisors. The students can choose one of these topics (or one that they have defined themselves) and develop their research proposal as the basis of their future Masters thesis (TMR) or research internship (IMIM). ¹		

¹ TMR students have to finish their research proposal during semester 1, IMIM students postpone the proposal to semester two due to other IMIM specific obligations in semester one (BBB1 and Spring School). The research proposal is equivalent to the IMIM BBB2 module.

Learning Outcomes	<p><u>On completing the module students:</u></p> <ol style="list-style-type: none"> (1) Independently work on a small research project (five weeks) in a research laboratory or clinical setting, handle the relevant laboratory methods and summarize their project in a written protocol/ small research report. (2) Actively interact with the research group they are working in, usually in an international and interdisciplinary environment (3) Present and explain their research project using a variety of techniques (written, oral) (4) Discuss their and others' research project/s within a group of peers and give constructive feedback on topics in similar and other research fields (5) Independently research all relevant information for writing a practice research proposal to support their research work and write such a proposal (6) Understand research proposals written by their peers and independently research all relevant information to constructively review other's research proposals (7) Create a written review of other's research proposals (8) Receive constructive written criticism from their peers (9) Improve their research proposal while taking the criticism of their peers into account and write a rebuttal to the criticism
Prerequisites	<ul style="list-style-type: none"> • Participation in Modules 1 and 2
Useful Prior Knowledge	<ul style="list-style-type: none"> • Basics of literature research, critical paper reading and writing • Presentation skills • Laboratory methods
Assessment Methods	Students' achievement of the learning outcomes of the course will be assessed through a written protocol describing the experiments, the rationale behind them and some background information of an individual five-week laboratory research project (3.1) and the evaluation of a written research proposal, written review and rebuttal of the reviewer's criticism (3.2)
Registration Requirements	Enrolment in the M.Sc. programme Translational Medical Research
Module classification	To be taken in semester one of TMR or two of IMIM

Module Number Module 4	Module title Translation in Lab and Clinics		ECTS Credits 7
	Student Investment Time (SIT) 240 hours		Course Offered Annually in January/February Duration 5 weeks
	Lectures, seminars, workshops & tutorials	90	
	Practical courses	30	
	Self-study	120	
		Lectures, seminars and tutorials provide theoretical and methodological foundations; practical courses teach experimental approaches. Self-study time includes the time required to prepare for and complete all course assessments.	
Topics Covered/ Courses	<u>Compulsory courses:</u>		
	4.1 Case studies Provides an overview of established and experimental therapies and gives an insight into how translational therapies develop into accepted and established therapeutic strategies. Selected examples of targeted therapies and translational medicine will be explored in depth in the context of workshops and seminars in order to illustrate their principles, development and application in clinical practice.		
	4.2 Infrastructure for translational research Infrastructure necessary for translational research, e.g. biobanking is explored in depth.		
	4.3 Drug development Provides an in-depth insight into the principle of drug development and design.		
	4.4 Translation lab (compulsory elective course) Laboratory course in small groups: students choose from a variety of topics from molecular oncology, neurobiology, vascular medicine and others.		
	4.5 Industry and innovation This course focuses on how to develop a translational outcome into a commercial application and is supplemented by project design and management contents.		
Learning Outcomes	<u>On completing the module students:</u>		
	(1) Explain current major translational therapy strategies, and how these are being developed and applied in the clinical setting based on case studies. (2) Be able to discuss the theory behind experimental therapies and targeted therapies and deduce how they are actually put into practice through the analysis of real-life examples. (3) Develop own ideas for possible future translational therapies, and design, in theory, an own translational research project. (4) Understand the principles of biobanking and know which formal requirements have to be taken into account before using samples from biobanks or before obtaining samples to be stored in biobanks. (5) Assess for which experimental questions biobanked tissue can be used reasonably. (6) Explain the principles and examples of novel disease treatment currently under development, e.g. targeted molecular delivery, tools for regenerative medicine, stem cell therapy etc. (7) Explain the current state of the art in genomics, proteomics and metabolomics and reproduce examples of their use for translational medicine (8) Understand and reproduce in detail how a pharmaceutical drug is designed and developed from lead compound to end product. (9) Understand how translation is taken beyond the clinic, e.g. into commercial applications. (10) Understand and apply the principles of project management and design to develop their own project during the master thesis. (11) Determine which laboratory methods should be used for a certain translational research question and apply them in a laboratory setting of their choice from one of the Medical Faculty’s foci.		

Prerequisites	<ul style="list-style-type: none"> • Participation in Modules 1 – 2 and course 3.1
Useful Prior Knowledge	<ul style="list-style-type: none"> • Laboratory methods • Biological basis of disease • Current challenges in diagnosis and therapy
Assessment Methods	Students' achievement of the learning outcomes of the course will be assessed through a combination of colloquia and evaluation of examinations of theoretical content at the end of module 4
Registration Requirements	Enrolment in the M.Sc. programme Translational Medical Research
Module classification	To be taken in semester one of TMR, prerequisite for Module 5

Module Number Module 5_{TMR} (TMR students only)	Course Title Master thesis research project with written master thesis and oral presentation		ECTS Credits 30
	Student Investment Time (SIT) 900 hours		Teaching-Learning Activities (TLA) Individually supervised research project
	Lectures, seminars, workshops & tutorials	60	
	Practical courses	N. A.	
	Self-study	840	
		Module Offered continually	Duration Five to seven months
Topics Covered	Defined on an individual basis		
Parts	5 _{TMR.1} Master thesis research and writing 5 _{TMR.2} Master thesis presentation and defence		
Learning Outcomes	<u>On completing the module students:</u> 1) Independently research and evaluate the quality of a research group and interview the PI/project supervisor to determine if the research fits with their interests and career management 2) Formulate a research project in translational medicine and identify the methodology for the solution of the research question in collaboration with their supervisor 3) Autonomously work on a specific research project in a laboratory, industry or clinical setting 4) Participate actively in lab routines such as journal clubs, progress reports and academic discussion. 5) Acquire knowledge independently and apply this knowledge in practical situations 6) Seek, process and critically analyze information from different sources in order to develop innovative and creative solutions to research problems 7) Communicate questions and findings with others in their field as well as in an interdisciplinary setting using a variety of media 8) Select the relevant practical tools to answer research questions and work with these tools in a collaborative setting 9) Design and manage projects 10) Work in an international, multi-cultural and multi-disciplinary team, actively participating in discussion 11) Provide, accept and consider constructive criticism 12) Write a detailed scientific manuscript in form of a thesis 13) Present and defend scientific information 14) Demonstrate their assimilation and critical reflexion of the topics covered in the Masters degree course “Translational Medical Research”		
Prerequisites	• Participation in Modules 1-4 Successful passing of examinations in the TMR course of at least 30 ECTS		
Useful Prior Knowledge	• Laboratory research experience		
Recommended literature	Individually defined according to research project and supervisor		
Assessment Methods	The students’ progress and development will be monitored through a combination of: Evaluation of written master thesis, individual supervision, results obtained in informal lab meetings and final presentation of the research project.		
Registration Requirements	Enrolment in the M.Sc. programme Translational Medical Research		
Module classification	Usually taken in semester two of TMR, prerequisite for course graduation		

Module Number Module 5_{IMIM} (IMIM students only)	Course Title Extended research project and personal development		ECTS Credits 30
	Student Investment Time (SIT) 900 hours		Module Offered continually Duration ca. 5 months
	Lectures, seminars, workshops & tutorials	100	
	Practical courses	N. A.	
	Self-study	800	Individually supervised research project
Topics Covered/ Courses	<u>Compulsory courses:</u> 5_{IMIM}.1 (IMIM module BBB1) – 4 ECTS During this course students will learn in detail about research of at least one research group within the IMIM partner institutes. Information collected during an interview will be used to qualify the research group, the researcher (who could act as supervisor during the research project) and the research project. Based on a quality analysis, students will prioritize possible research projects. Students write a report within their BBB learning group.		
	5_{IMIM}.2 (IMIM Spring School on personal development) – 2 ECTS: The Spring School focuses on the students' personal development and growth and their acquisition of soft skills. This school takes place annually in Heidelberg or Mannheim.		
Learning Outcomes	5_{IMIM}.3 – 24 ECTS: Research project of around 20 weeks, written summary and oral presentation Topics defined on an individual basis		
	<u>On completing the module students:</u> (1) Have an overview of the research performed within the IMIM partner universities, (2) Can judge the quality parameters of a researcher (Principle Investigator), including impact-factor, H-factor, ranking of journals in a specific field. (3) Evaluate the quality of a research group and individual researchers, (4) Motivate the top-3 research projects based on the quality analysis, (5) Communicate their choices well (in an oral and written manner), (6) Interview researchers, to build their professional network. [5_{IMIM}.1] (7) Use tools to plan and manage time efficiently (8) Reflect on their learning methods and make adjustments if needed (9) Have created a personal development plan (10) Have an understanding of what their strong and weak points are in interpersonal skills and which role they can take in a group process (11) Have improved their communication skills (12) Have theoretical knowledge on and competence in situational leadership [5_{IMIM}.2] (13) Formulate a research project in translational medicine and identify the methodology for the solution of the research question in collaboration with their supervisor (14) Autonomously work on a specific research project in a laboratory, industry or clinical setting (15) Participate actively in lab routines such as journal clubs, progress reports and academic discussion. (16) Acquire knowledge independently and apply this knowledge in practical situations (17) Seek, process and critically analyze information from different sources in order to develop innovative and creative solutions to research problems (18) Communicate questions and findings with others in their field as well as in an interdisciplinary setting using a variety of media (19) Select the relevant practical tools to answer research questions and work with these tools in a collaborative setting (20) Design and manage projects (21) Work in an international, multi-cultural and multi-disciplinary team, actively participating in discussion (22) Provide, accept and consider constructive criticism (23) Summarize their scientific work in a written format such as a report or scientific paper, as well as orally present and defend it [5_{IMIM}.3]		

Prerequisites	<ul style="list-style-type: none"> • Participation in Modules 1-2 and 4, and course 3.1. Successful passing of examinations in the TMR course of at least 26 ECTS
Useful Prior Knowledge	<ul style="list-style-type: none"> • Laboratory research experience
Recommended literature	Individually defined according to research project and supervisor
Assessment Methods	<p>The students' progress and development will be monitored through a combination of:</p> <p>Evaluation of written report of 5IMIM.1 and presentation during 5IMIM.2. Evaluation of written experimental protocols and experimental results as well as written report, individual supervision, results obtained in informal lab meetings and final presentation of the research project (5IMIM.3).</p>
Registration Requirements	Enrolment in the M.Sc. programme Translational Medical Research and IMIM
Module classification	Compulsory course for semester two of IMIM, includes semester one BBB1 and IMIM Spring School

Study chart

Semester 1

Module 1

Module 2

Module 3

Module 4

Research lab can be done in a laboratory of choice, also outside the University.

Semester 2

Module 5

Research project and writing can be performed in a laboratory of choice, also outside the University and/or abroad.