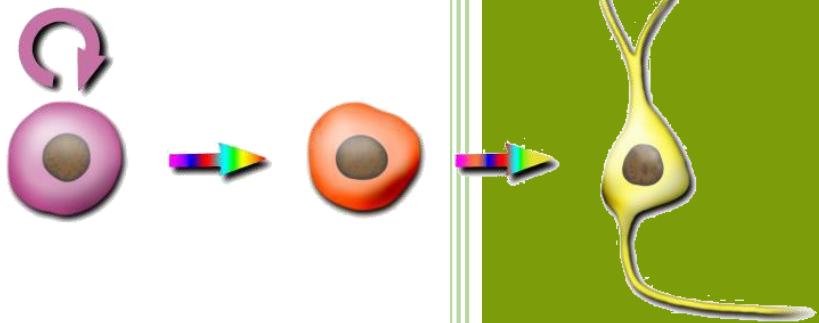


Handbook for Students



Ruhr-Universität Bochum
iSTEM
2022/23

Welcome to the Ruhr-University Bochum!

Welcome to the International Master Molecular and Developmental Stem Cell Biology at the Ruhr-University Bochum. Congratulations on making both an excellent and successful choice for your further studies!

Stem cells have a major impact on nearly all disciplines of life sciences dealing with eukaryotic cells or organisms. Predictably, a strong demand for young scientists who are able to cope with a highly interdisciplinary approach will arise in the near future.

We want to satisfy this demand by offering a highly interdisciplinary master degree program that is oriented towards cutting-edge research and current markets. The course combines traditional basic disciplines such as cell biology, histology, biochemistry and pathology with recent progress in epigenetics, bioinformatics and developmental biology to secure a broad understanding towards innovative translational approaches in medicine.

Particularly for the international students, the time in Bochum will be exciting, challenging, academically rewarding, and enjoyable.

This handbook has been prepared to help you to know more about the study program and to get an overview about the various courses offered in the program.

We wish you much success!

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Course Description

General

Courses described here one by one may be part of a greater unit called module. There are 13 different modules altogether. If one module consists of several components, they are marked in the same colour (see curriculum plan on page 14). Courses without colour code (white) constitute a self-contained module. For detailed information, please study the curriculum and the combined module handbook. <http://www.ruhr-uni-bochum.de/istem/concept.html.en> Forms for practical assessment, lab bench project and master thesis can be down loaded here <https://www.ruhr-uni-bochum.de/istem/Master.html>

Stem Cell Physiology I

The course is about developmental biology and how embryogenesis relates to stem cell biology. Special attention is given to the three germ layers with their derivatives. The lecture also comprises an introduction into stem cell categories. The end-of-term exam comprises a mixture of multiple-choice and free-text questions. In addition, there will be a seminar session during the semester: the students must present chosen original publications (about 15 min talk and 5 min discussion). This is done to improve presentation skills and in preparation for the examination. The attendance of the seminar is obligatory. The requirements for this presentation will be given during the introduction of the seminar. The students also have to give a written outline of this presentation one week before presenting. If you fail the seminar, you will have to repeat it in the following year. Only by passing the seminar as well as the exam leads to the acquisition of the CPS.

Stem Cell Lecture Series

The purpose of this module is to inform the students about the current state of knowledge in stem cell research. This series will continue throughout the 1st, 2nd and 3rd semesters. The lectures are presented by a multitude of external experts, mainly from NRW in the first and second semesters and international speakers in the third semester. Attendance is highly recommended and will be marked especially in the third semester. Students will be asked for a written brief summary of each lecture. At the end of the 2nd semester, a multiple-choice exam will be conducted.

Bioinformatics

This module is taught in cooperation with the Biochemistry master program. Therefore, the number of students is higher than in our usual lectures.

The lecturers are the members of the Biochemistry program and they convey an overview of bioinformatics with respect to systemic and molecular biosciences and enable students to apply them to case problems. Furthermore, sequencing methods and other current bioinformatics techniques are presented. Exam questions can be multiple-choice as well as free text answers.

Stem Cell Practical Courses

A **general introductory meeting will be held on 12th of October (Zoom meeting)** in cooperation with the faculty of Biochemistry. The faculty will give an overview of available courses and organization. A catalog can be found on the iSTEM website <http://www.istem.ruhr-uni-bochum.de> (use link on Moodle). Each iSTEM student must perform four practicals in total, each comprising 2 weeks. The

distribution is done by Prof. Dietzel – Meyer on the basis of a **priority list**. Please check in Moodle to be up-to-date!

Practical courses take place as follows:

October 24 th – Nov 4 th 2022	1. Lab course block
November 14 th – 25 th 2022	2. Lab course block
December 5 th – 16 th 2022	3. Lab course block
December 24 th – Jan 6 th	Christmas holidays
January 9 th – 20 st 2023	4. Lab course block
January 23 rd – Feb 3 rd 2023	5. Lab course block

To participate in the practical courses, it is **compulsory to attend the safety instruction lecture on 19th of October (Zoom meeting)**. Please check moodle course for Zoom link.

The supervisor of the practical course can decide whether the student has to do a report, a presentation or a poster for the evaluation of student's performance. Every practical is marked individually. The module mark is calculated as the mean value of the four marks.

Stem Cell Physiology II

This course consists of two parts: Neurobiology and Receptor Biochemistry and is part of the module Stem Cell Physiology.

The neurobiological part comprises the development of the embryonic nervous system. Lectures are presented by Prof. Wiese. The course is held within four weeks during the second semester, usually in May. A multiple-choice exam will be conducted at the end of the fourth week of this course.

The module part called "Biochemistry IV" is also taught in co-operation with the Biochemistry master program. Only the part presented by Prof. Günther-Pomorski is relevant for the exam, Prof. Hollmann's part is recommended to attend.

The subjects of this module are signaling pathways and receptor biochemistry. The exam is at the end of the 2nd semester and has four or five text exercises with subtasks. Both exams have to be passed and count equally towards the module mark.

Molecular Tracing Methods

The module “Molecular Tracing Methods” provides students with experience of all relevant microscopic techniques and their application range, including the use of ionizing radiation in medicine and biology, safety and protection regulations in order to perform biochemical tracing methods with radioactive labels. The handling of small amounts of ionizing radiation and the experiments with respect to radiation protection is taught. Three different tracing methods are presented in laboratories during the semester. At the end of the semester, one week is reserved for the complete radiation course (approx. September or October) and an exam will be conducted at the end of this course.

An additional certificated course in radiation protection is possible for German students. Have a look in “Courses with registration” for further information.

Molecular Genetic Methods

The module is teaching genetic engineering of cells, tissues and animals. Up to date background of molecular genetics, gene expression, genomic sequencing, gene transfer, genome editing, transgenic animals and gene analysis in medicine and disease are taught. Lecturer is PD Dr. Zähres. Guest lectures by Prof. Dietzel-Meyer, RUB and Prof. Füchtbauer from the Aarhus University will also be given. The exam at the end of the semester will have eight tasks (free-text).

Tissue Engineering

This module should give a broad overview about the current tissue engineering approaches and their clinical application.

Each lecture is given by a researcher from clinics, research institutes or private companies. In addition, there will be a seminar session during the semester: the students must present chosen papers (20 min talk with 10 min discussion). This is done to improve presentation skills and in preparation for the exam. In the end there is an oral exam.

Lab Rotation

This module should deepen the practical knowledge of the student. Furthermore, the student has the chance to obtain experience in a certain field of interest to find out, whether this research field might be an option for the master thesis.

The practicals can be done in a laboratory of the following list (<https://www.istem.ruhr-uni-bochum.de/international-teaching-staff/>) or in any other partner institutes of the master program.

It is mandatory to do at least one four weeks practical, but it is recommendable to do two of them.

Pathology of Degenerative Diseases

In the module “Pathology of Degenerative Diseases”, students will learn the medical basics necessary for the understanding of degenerative diseases of different organ systems including stem cell populations. The module comprises two parts: 2 hours lecture per week given by different lecturers and 1-hour seminar per week, which is supervised by the lecturer. The lectures are given by Dr. Napirei and other experts.

In the lectures, degenerative diseases of many different important organs and tissues are presented. In the seminar, histological

specimens including the macroscopic and microscopic morphology are presented by students that have to be prepared in advance.

The exam comprises 30 multiple-choice questions.

Scientific Responsibility in Biomedicine

In this module, the basics of law in our research field are conveyed as well as the ethical comprehension of it. This course is held by Dr. Haltaufderheide, PD Dr. Zähres and PD Dr. Schmidt.

The courses together give a general survey of legal aspects (German Stammzellgesetz (StZG) and Gentechnikgesetz (GenTG)), the role of biomedical science and different moral theories to current controversies in biomedical ethics.

The mode of examination for the first two parts of the module are active participation in discussions and individual oral presentation during the lecture.

The course “Animal Care and Handling” is a part of this module. It ends with a written exam. Take a look in “Courses with registration” for further information.

Lab Bench Project & Grant Writing

The students will learn how to plan, perform and interpret lab experiments, chosen from a range of particular methods, to solve a particular scientific question. They will also be able to design a research proposal for a suitable funding source.

The lab bench project should give the first opportunity to start with the topic of the master thesis. It starts in January of the third semester. It is not allowed to work on this Lab Bench Project for longer than 3 months (6 weeks is the minimum).

Master Project

The master project can only be chosen from the offers made by the professors and lecturers actively involved in the M.Sc. Program. Topics offered are announced on the website: <https://www.istem.ruhr-uni-bochum.de/masterthesis-topics/>

Importantly, the master thesis must be applied for to the Head of the Examination Board via

Mrs. Christiane Gelhaus or Mr. Simon Keil **up to four weeks** after the Lab Bench Project and Grant Writing has been completed, i.e. submitted, not marked. The date of completion has to be documented on a special form. To observe the deadline is absolutely mandatory to pass the master thesis!

The project has to be at least 5 months and maximally 6 months and is assessed by a written master thesis. No official colloquium is necessary, but you have to present your results to the supervisors.

Courses with registration

Language Course

During your studies your language skills will be supported. For this module you have to participate in language courses to gain at least 4 credit points in total. It is recommended to attend courses during the first and the second semester.

English native speakers should attend German courses, whereas German students should attend English courses. Bilingual students (very good in English and German) can choose another language. It is highly recommended to reach a B1 level in German and a C2 level in English during your studies!

All language classes can be found on the website of the Centre for Foreign Language Acquisition (Zentrum für Fremdsprachenausbildung (<http://www.zfa.ruhr-uni-bochum.de/>)). For all advanced classes and for all English classes, an electronic placement test has to be done first. You have to register for this test online here: <http://www.zfa.ruhr-uni-bochum.de/lehre/einstufung/index.html.en>

With a placement test, students can apply for the courses via Campus Office or vis e-campus. The result of the placement test can be used for two semesters as entry qualification. For registration deadlines, please check the following link <http://www.zfa.ruhr-uni-bochum.de/lehre/fristen/index.html.en>

From 2017 onwards, we recommend a new module for German language and German culture that has been implemented by the department of DaF (Deutsch als Fremdsprache <http://www.daf.ruhr-uni-bochum.de/index.html.en>).

For detailed information and registration, please contact Ms. Anja Häusler (Anja.Haeusler@rub.de).

Most language classes take place throughout the weekdays and in most cases, a maximum of 2 absences is allowed. Therefore, it would be wise to plan your language courses in accordance with the timetable of the study program. The second semester of the master program is the one with the most lectures and exams, but language classes will fit in your timetable. If you want to do a language class in the third semester, you should be aware that sometimes the lectures and exams will be finished before the Christmas break to allow for your mobility slot. The language courses continue until the end of the semester and therefore, you have to be present during that time. The lab bench project therefore cannot be too far away from Bochum, to ensure that the miss-outs do not exceed two times.

Course in Animal Care and Handling / FELASA

The module “Basic Animal Handling” conveys the fundamental knowledge about animal experiments. The lectures include the study of law, the 3 Rs and the biology of animals. In practicals, the students will be trained to handle animals. The course is assessed through a multiple-choice exam at the end of the 2nd semester. It is not necessary to apply for this course; the students taking part in our program are enrolled for it.

For German students, it is possible to substitute this module with a certified German FELASA B course. The FELASA course is taught in German and it requires some additional practicals. Therefore, this course covers two semesters. The FELASA B course starts every semester for the whole university and PD Dr. Schmidt is the contact person for dates and further information.

Radiation Course

The radiation course is part of the module “Molecular Tracing Methods”. It will be a one-week course in the semester break

between the second and the third semester. It covers legal aspects of radiation safety, the physical background of radiation, the medical use and three experimental set-ups. An exam mixed with multiple choice and physics questions will be written at the end of the course. The lectures are given by Dr. Fonteinou.

As an option for our German speaking students (native or at least C1-Level) we can also offer the course in German.

It is possible to do an additional German radiation course with certificate. You have to send Dr. Fonteinou an e-mail to apply for this additional course.

General information

Online Platforms

Moodle

Moodle is one of the digital learning platforms of the RUB. You can find your course in Moodle using the `course number`, given to each course. Most lectures, exercises, papers and additional information will be uploaded on Moodle by the module coordinators. The login information for your personal Moodle account will be given to you after your enrollment to the Master program.

CampusOffice

CampusOffice is a digital platform to register for certain courses like the language courses. You need a card reader to enter. You can either use the ones at university or buy one for 20 € at the info point.

Information about exams

First and second exam dates

There are only two annual possibilities to write the exams. Two dates are announced for each exam, mostly one at the beginning of the semester break and one at the end of the semester break.

Improvement of the grade

It is possible to improve your exam mark if you passed your exam the first time. Only one additional attempt for each exam will be allowed to improve the score.

Facebook

If you like to, you can join the Facebook group iSTEM@RUB

Contact Persons

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BAS: Basic Animal Handling

BC: Biochemistry

Bioinfo: Bioinformatics

GLC: German language course

LS: Lecture Series

M.C.: Module Coordinator

MGM: Molecular Genetic Methods

MTM: Molecular Tracing Methods

Patho: Pathology of Degenerative Diseases

SCP: Stem Cell Physiology

SRB: Scientific Responsibility in Biomedicine

TE: Tissue Engineering

Curriculum

Master of Molecular and Developmental Stem Cell Biology						
Semester	Module component	Lecture	Seminar	Practical	Exam	CP
1. Semester (WS)	Stem Cell Physiology I	2	1		X	5
	Stem Cell Lecture Series I	1				2
	Bioinformatics	2	1		X	5
	4x Stem Cell Practical Courses		4	16		16
	Language Course I		1		X	2
28 SWS	Sum	5	7	16		30
2. Semester (SS)	Stem Cell Physiology II	2	1		XX	5
	Stem Cell Lecture Series II	1			X	3
	Molecular Tracing Methods		1	3	X	5
	Molecular Genetic Methods	2	1		X	5
	Tissue Engineering	2	1		X	5
	Lab Rotation		1	8		5
	Language Course II		1		X	2
25 SWS	Sum	8	6	11		30
3. Semester. (WS)	Stem Cell Lecture Series III Advances in Stem Cell Research	1	1		X	2
	Pathology of Degenerative Diseases	2	1		X	5
	Course in Animal Care and Handling	2		1.5	X	5
	Bioethics including legal aspects		2			3
	Lab Bench Project & Grant Writing		1	13		15
24.5 SWS	Sum	5	5	14.5		30
4. Semester (SS)	Master Project		1			30
	Total	18	18	41.5		120

