

MSc Physics of Life

[English:] Guidelines for the module *Research Projects*

[German:] Richtlinien für das Modul *Forschungsprojekte*

These guidelines should be used as a supplement to the MSc Physics of Life (abbreviation: MSc PoL) study guidelines document ("Wegleitung") and help students and supervisors to plan, conduct, and assess the research projects. This document also contains the research project agreement form.

1 Introduction

During the course of study for the Master's degree in Physics of Life, students not only follow lectures and seminars but also carry out two research projects each worth 10 CP. These research projects will be conducted under the responsibility of a member of the teaching staff of the Faculty of Science or the teaching staff of the Department of Biomedicine, the Department of Biomedical Engineering, the Friedrich Miescher Institute for Biomedical Research, or the Swiss Tropical and Public Health Institute. Important formal aspects of the research projects:

- Each of the two projects usually lasts three months.
- The project work can be carried out in 2/3 part-time, so that courses can be attended during the project in the remaining 1/3 of the student's working time.
- The topic of the project work needs to be in the subject area Physics of Life.
- The two research projects and the master's thesis can be carried out in the same research group or in different research groups.
- Each research project is completed with a final written report and a presentation to the research group.

The assessment of student performance in the two research projects is carried out by entering a learning contract in the online services of the University of Basel (for the acquisition of credit points outside the regular course offerings; <https://services.unibas.ch/>). The learning contract specifies the topic, content, duration, form and scope of the performance assessment, any revision and repetition options, the number of credit points that can be earned as well as the type of assessment and the allocation of the credits to a specific module. The learning contract is approved by the student, the responsible faculty member, and the chairperson of the teaching committee before the project work begins. Each research project is assessed as pass/fail.

2 Aim of the research projects

The research projects will provide students with important skills needed to carry out their own independent scientific research. Working on their own project will familiarize the student with scientific research and will encourage independent, analytical thinking. Students are expected to be fully in charge of organizing and planning their project, i.e. it is the student's responsibility to find a research group and apply for a project position. Students will learn how a project should be organized, carried out and presented to a scientific community. Literature research, independent work on their project, and a written summary/conclusion that will be discussed with members of the host group are therefore part of the project.

Students are not asked to work on a publication, but rather to develop curiosity and motivation for a further research project. Although the time frame for the project does not allow its development towards a publication, it is desirable that students are part of an ongoing project where they can introduce new ideas.

For each of the two projects 10 credit points are awarded, which correspond to 300 h¹ of work for the student, including preparations, reading at home, writing the summary and preparing the final presentation. The students will visit the semester's courses in parallel.

3 Procedure

The student should discuss the topics and potential research groups together with their assigned advisor from teaching committee. The student will contact the respective host principal investigator (PI), who will coordinate the project. The host PI can of course ask the MSc PoL teaching committee for more information.

Before the research project:

- Prior to the practical work, students work out a concept with their host PI including the following points:
 - Scientific question
 - Educational objectives (which methods have to be mastered and understood)
 - Time frame, division between experimental, analytical, and writing parts
- The student and the host PI fill in the agreement (last page of this document) and send it to the student office of the MSc Physics of Life.
- The student needs to submit a learning contract.
- The host PI needs to approve the learning contract before the project.
- The host PI informs his/her administrative assistant that a student will join the lab for a research project (at least two weeks before project start). This is important for insurance and access to the building.

After the research project:

- The host PI needs to grade the learning contract (pass/fail) once the project is completed.

3.1 Time Frame

Projects are credited with 10 ECTS. This corresponds to an effort of 300 hours: with a 66% workload this is around three months. This time frame includes study as well as the writing of the report.

During the project, the previously defined educational objectives have to be fulfilled. Students are not asked to prolong their work in order to achieve better research results. The project report and the oral presentation should be handed in / take place within four weeks after completion of the research.

3.2 Supervision

For the entire duration of the research project, students are supervised by a PhD student or a postdoctoral researcher of the group. The supervisor schedules the project work together with the student and provides an introduction to the computational and laboratory skills (depending on the project) that are needed. She or he is then the contact person for all questions and problems during the project. If required, she or he may also ask for a progress report and preliminary results while the project is still ongoing.

Before a project position is offered, supervisors as well as the head of the research group should be conscious of the time and space needed for an additional person.

4 Assessment

Projects are assessed with pass / fail, based on performance in the practical work, the written report, and a short presentation during a group seminar.

¹ See also: *Rahmenordnung für Masterstudiengänge*, faculty website: philnat.unibas.ch, § 6.5: The calculation of credit points is based on the European Credit Transfer and Accumulation System (ECTS). One credit point corresponds to 30 hours of study.

4.1 Guidelines for the report

The report should be max. 25 pages (A4) long. The report should include an introduction, a section covering the methods and materials used, results and a discussion. Evidence that the student got involved with the available literature, and that experiments were analyzed and discussed critically, must be given in the introduction and the discussion section of the report. Students should be able to draw scientifically relevant conclusions.

4.1 Guidelines for the presentation

The students have to present the results of their research project in a talk during a group seminar. The duration and format of the talk should be arranged with the hosting research group.

5 Deadlines

The project report must be submitted to the host PI not later than four weeks after completion of the practical work, and the oral presentation should also take place within four weeks after completion of the research. If this deadline is exceeded, the assessor (host PI) is no longer obliged to accept the work.

6 Research groups that can host MSc PoL research projects

The host PI must be a member of the teaching staff of the Faculty of Science or the teaching staff of the Department of Biomedicine, the Department of Biomedical Engineering, the Friedrich Miescher Institute for Biomedical Research or the Swiss Tropical and Public Health Institute. A list of possible supervisors is available on the MSc PoL website.

7 Details for the *Learning Contract*

The learning contract defines the conditions for acquiring the 10 credit points for a research project in the MSc PoL module *Research Projects*. The project supervisor guarantees the necessary supervision and the infrastructure required to carry out the project work.

The project work must be approved before the start of the project with a learning contract between the supervisor, the Teaching Committee (German: "Unterrichtskommission, UK"), and the student. After the project, the learning contract needs to be assessed by the supervising PI. To fill in a learning contract on the website services.unibas.ch, the student enters the data in services according to the instructions provided (see MSc PoL website on research projects or instructions in services.unibas.ch)

- Enter the start date
- Enter the submission date (Duration: usually 3 months).
- "Learning Format" ("*Art der Studentischen Leistung*"): Chose 'Project work' from the dropdown menu
- "Credits": must be 10 CP
- "Grading format": pass/fail
- "Title", enter a title, be aware this will show up in your transcript of records
- "Content" (enter a short description)
- "performance review" (form, scope): here you need to mention that your performance will be assessed by practical work, a written report (on the experimental design, experiments or theoretical investigations, as well as critical discussion of the results) and a short oral presentation.
- "Assessor": Choose the Uni Basel PI who is supervising the project. The assessor evaluates the project work online.

8 Contact

Student office Physics of Life:

Sarah Güthe, +41 61 207 16 49, Sarah.Gueth@unibas.ch

Biozentrum, University of Basel, Spitalstrasse 41, 4056 Basel. Office room: 08.004

Head of the teaching Committee:

Knut Drescher, knut.drescher@unibas.ch

Agreement & Registration of a Research Project

Student:	Matriculation number:
Project start date:	Prospective project end date:

Supervisor of the Research Project:

Host PI / supervisor: (Name)	Affiliation of the host PI / supervisor (Institute and email address):
---------------------------------	---

Direct supervisor (if it is not the PI) (Name and Email):	Role in research group (eg. Postdoc, research associate etc.)
--	---

Title of the project

Topic of the project

Short description of the project (200-300 words) (project description incl. methods to be used)

Signatures

Assessor of the project (host PI)	Student
Basel,	Basel,