Curriculum

Münster Graduate School of Evolution (MGSE)

1. Introduction

Based on a scientific program that bridges the Faculties of Biology, Medicine, Geosciences, Mathematics, and Philosophy, the MGSE provides doctoral students with the necessary skills for acquiring and applying knowledge in a multidisciplinary world. The curriculum of the MGSE is tightly linked to its research questions, but also based on a strong theoretical and philosophical foundation for all participating students. The three-year teaching program takes the diversity of future careers into account and is tailored towards developing scientists who see interdisciplinary connections in the multifaceted aspects of evolutionary problems.

2. Curriculum overview

The entire doctoral studies are accompanied by the interdisciplinary **"studium integrale"**, which encompasses, for example, multidisciplinary lectures and courses and that is also open to members of other faculties in the University of Münster.
The three-year teaching program furthermore includes regular **meetings** in order to facilitate scientific and personal exchange.
The education program is structured into three periods, according to years one to three of the PhD projects. During the first period doctoral students are trained in a cross-disciplinary manner, participating in courses within and outside their faculties and visiting labs of other disciplines, in order to facilitate the interdisciplinary approach of each student and to promote contacts between the labs. The second period is meant to increase the students' scientific communication skills and includes for example topic group work and contributions to conferences. The third period is shaped according to the students' individual plans and inclinations, such as professions in academia, industry and society. The training program is complemented by **project-oriented training** in the respective research groups, where the doctoral students are fully integrated members.

3. "Studium integrale"

A key feature of the MGSE is the multidisciplinary "studium integrale" (Integrated studies) for all students of the school, which is also open to students and scientists from other faculties of the University of Münster, further increasing the opportunities for interdisciplinary contacts for the MGSE students.

The "studium integrale" accompanies the entire doctoral studies and consists of

- the seminar series "Basics in Evolution",
- the lecture series "The Growth of the Evolutionary Thought",
- the MGSE Summer School,
- the MGSE Colloquium,
- and the organization of an MGSE-related event

The weekly **seminar series "Basics in Evolution"** takes place two years in a row in the summer semester, followed by one year of break. It is organized as a discussion seminar by the doctoral students. Students form small groups that are responsible for organizing the contents of and moderation of at least one appointment within the seminar series. The format is flexible; students may invite a PI, postdoc or advanced doctoral candidate to give a short introductory talk. Alternatively, students may prepare and present a talk based, e.g., on a paper themselves as an introduction. The introductory talk is followed by a discussion. The aim of this seminar series is scientific exchange and discussion of topics from evolutionary research.

In the winter semester, the weekly **lecture series "The Growth of the Evolutionary Thought"** provides an in-depth introduction to the history and philosophy of evolutionary thinking, the basics of the theory, and philosophy of science in general.

Doctoral students are involved in the preparation of the **MGSE Summer School**, which is a major event bringing together the doctoral students. They are invited to plan and participate in workshops that seem helpful to them at their current stage.

4. Regular meetings

In order to facilitate the contacts and scientific exchange between doctoral students, the doctoral candidates of MGSE meet on a regular basis for discussion and socializing. During the Colloquium**,** all doctoral students from the different disciplines meet to discuss scientific, organizational, and personal matters. During the colloquium, one or more students have the opportunity to present their project(s). The colloquium may be organized as a monthly event or as a workshop once per semester. It may be linked to a Career Talk by an MGSE alumni or external speaker who shares insights into their professional journey after completing their doctorate. The Colloquium is organized by the MGSE Coordinator in cooperation with one doctoral candidate.

5. Three-phase education program

A modern doctoral program and research training should recognize the diversity of future careers. Since career plans differ greatly among the doctoral candidates, the curriculum is tailored to individual students, especially towards the end of the doctoral phase. The curriculum is therefore structured into three periods, according to years one to three of the doctoral studies.

5.1 First phase: Cross-disciplinary Training

The first period aims at cross-disciplinary training. Students have the opportunity to participate in a selection of courses within the MGSE research areas. These may be courses specifically designed for the MGSE as well as courses from the established master programs, both within and outside of the own faculty.
For example, the lecture series "The Growth of the Evolutionary Thought" is accompanied by a seminar, thus constituting a course for Master and doctoral candidates from the faculties of biology, medicine, geosciences, and philosophy. While MGSE graduate students are obligated to attend the lecture series at least once, they may voluntarily participate in the seminar (5 credit points for both together).
Doctoral candidates are encouraged to spend a minimum of one week in a lab of another discipline, which may or may not be part of the MGSE (lab rotation). The lab should however have strong affiliations with one of the involved groups. The lab rotation strengthens the interdisciplinary approach of the student and facilitates the ability to learn new methods or perspectives on the studied subjects. In addition, the lab rotation exposes the doctoral candidates to new research environments and may facilitate collaborations between labs. The initiative for conducting a lab rotation is the responsibility of the doctoral students. Upon request, the MGSE Coordinator will advise on and assist in the organization of lab rotations.

5.2 Second phase: Science-skills Training

The second period is aimed at scientific communication skills. All doctoral students are required to attend a training on Good Scientific Practice and at least one conference. The trainings on Good Scientific Practice do not necessarily need to be organized by the MGSE but may also be offered by, e.g., the Münster Centre for Emerging Researchers (CERes), joint projects like Collaborative Research Centres or in collaboration with other RTGs or graduate schools. They can also be completed outside the University of Münster. To promote a culture of interdisciplinary discourse, students may establish temporary working groups supported by mentors to develop research outputs suitable for scientific publication.

5.3 Third phase: Tailored Education

The third period focuses on qualifications that are tailored to the individual students' career plans and is based on the doctoral candidate's own initiative. Towards the end, the program allows for following the candidate's interests and career visions. They can for example be supported in following the academic track, the industry track or the society track (which contains, e.g., prospective journalists, publicists, museum and zoo staff, employees in the field of clinical research or education, scientific writers, or administration officers in university and science management). The thesis advisory committee will address this topic from the second committee meeting onwards and accordingly aim to support the doctoral candidates.

The MGSE provides necessary skills for interdisciplinary work in science management and communication in close cooperation with the CERes, which offers a wide selection of soft skill

and language courses. In the last phase of the doctoral studies, the doctoral candidates are supported by the Career service of the University of Münster regarding job applications or proposal writing. Beyond the career guidance and support the doctoral candidates receive, they are required to take the initiative and organize their third-year training program according to their own wishes and plans, thus increasing their independence.

6. Project-oriented Training

During the entire doctoral studies, the candidates are fully integrated members of the research groups of their supervisors and take part in all scientific and social group activities. The doctoral candidates profit from the excellent research environment and the international network provided by the participating PIs and their groups. While being fully integrated into the network of the research labs and MGSE structure, doctoral candidates are able to exert autonomy and develop their leadership and administration abilities.

7. Credit point system

We use a clear and transparent credit point (CP) system to ensure that the doctoral candidates can easily oversee the activities that are required to graduate within the MGSE.

Through their participation in the core courses, the doctoral candidates should earn at least 6 CP. They are required to participate at least once in the seminar series and the lecture series. Furthermore, they have to obtain at least 2 CP by participating in the colloquium.

Core courses		min.	max.
- Seminar series 'Basics in Evolution'	**1 CP** per semester	**6 CP**	1 CP
- Lecture series 'The Growth of the Evolutionary Thought' (at least 8 appointments; equals 80% of one lecture series)	**1 CP** per semester		3 CP
- Participation in MGSE Summer School	**1 CP** per event		3 CP
- Organisation of an MGSE related event (e. g. MGSE Summer School, MGSE Symposium, lecture series, Career Talks, …)	**1 CP** per event		3 CP
- MGSE Colloquium (at least 75%)	**1 CP** per year		3 CP

At least 9 CP should be earned within the three-phase education program by accomplishing freely chosen activities from the respective education program. Doctoral candidates must provide evidence of at least three different activities.

Three-phase education programme		
Cross-disciplinary training		9 CP
– Courses from Master programs (4 weeks advanced modules) – Lab rotation	**5 CP** each **1,5 CP** / week	
– Journal & book clubs (1 SWS)	**1 CP** each	
– Workshops (2 days; in a field of relevance to the MGSE)	**1 CP** each	
1. Science-skills training		
– Topic group work (1 SWS)	1 CP each	
– **Good Scientific Practice training (mandatory)**	**1 CP**	
– **Contribution to conference (1 CP mandatory)**	**1 CP each**	
– Paper publishing	2 CP each	
– Research stay abroad (4 weeks)	5 CP each	
2. Tailored Education		
– Internship (4 weeks) – Soft skill and language courses	**5 CP** each **0,5 - 2 CP** each	
– Mentoring bachelor/master students (research module, bachelor thesis, master thesis) – Contribution to MGSE outreach/non-scientific publications	**0,5 - 2 CP** each **0,5 - 2 CP** each	

Regarding the teaching activities, doctoral candidates of the MGSE are required to follow the doctoral regulations of their faculty. Doctoral candidates enrolled in the faculty of Biology have to teach five hours of instruction per week in total. Details are regulated by the doctoral regulations of the faculty.

To graduate within the MGSE, doctoral candidates are requested to earn at least 15CP**:**

- at least 6 CP within the core courses,
- at least 9 CP within three-phase education program

It is possible to balance the CP across the three years and to shift activities from one phase to another, to allow a flexible PhD project structure. In case of doubt the MGSE Speaker and the MGSE Coordinator decide which activities qualify for the acquisition of CP and how many CP will be assigned. Calculations are based on the total workload required to successfully complete a course with 1 CP corresponding to 30 h workload.