

Proposal for the distribution of doctoral credits for educational activities

Starting from the 40th cycle, the PhD program in Mathematics will have a more detailed structure for educational activities than in the past. The training path of a doctoral student will be divided into 180 doctoral credits (DCs), evenly distributed over the three years. The doctoral credits will be earned through research activities and training activities. When transitioning between years or during the admission to the final exam, the number of credits earned for training activities will be verified, and the remaining credits for that year will be certified as research activities.

The doctoral path is divided such that eighty percent of the credits are dedicated to research activities, while the remaining twenty percent is dedicated to training activities, as shown in the following Table A.

| Type of activity | Total number of DCs | % |
|---------------------|---------------------|-----|
| Research activities | 144 | 80 |
| Training activities | 36 | 20 |
| Total | 180 | 100 |

A recommended number of doctoral credits for training activities is set to be achieved each year, with a minimum number in the first two years to guide the activities. Failure to reach the minimum number interrupts the doctoral path. These values are summarized in the following Table C.

| Training DCs to be acquired | Recommended number | Minimum number |
|-------------------------------|--------------------|----------------|
| At the end of the first year | 18 | 12 |
| At the end of the second year | 30 (12) | 24 |
| At the end of the third year | 36 (6) | |

The credits for educational activities are divided into the following categories:

Disciplinary and multidisciplinary training

Soft skills

Extra-curricular training

Dissemination

Supplementary teaching and tutoring

Disciplinary and multidisciplinary training includes the educational activities of the PhD courses, attendance at disciplinary seminars and participation in working groups focused on disciplinary or multidisciplinary topics (e.g., topics in mathematics).

Soft skills refer to the attendance of broader training activities aimed at acquiring soft skills, such as knowledge of good scientific practices, communication, and others. These activities will be organized centrally and may be complemented by activities planned directly by the PhD board.

Extra-curricular training refers to a series of activities closely related to the doctoral students' education, such as participation in PhD schools, documented organization of conferences and participation in doctoral symposia.

Dissemination activities refer to participation in conferences or seminars held by the doctoral students.

Supplementary teaching includes all teaching activities provided, including tutoring and activities supporting teaching (such as preparing exercises or teaching materials).

For each of these activities, a minimum number of credits is to be achieved, sometimes with a maximum limit to avoid overly imbalanced training. These details are summarized in the following Table B.

| Table B – Requirements for DCs distribution between training activities | | |
|--|------------------------------|------------------------------|
| Type of activity | Minimum number of DCs | Maximum number of DCs |
| Disciplinary and multidisciplinary training | 15 | |
| Soft skills | 1 | 3 |
| Extra-curricular training | 1 | |
| Dissemination | 1 | |
| Supplementary teaching and tutoring | 0 | 18 |

Equivalence between activities and credits

For each type of activity, a recognition of credits is provided that also takes into account activities carried out independently (e.g., individual study during a course).

Disciplinary and multidisciplinary training:

- Disciplinary and multidisciplinary training courses will be divided into two types:
 - a) Institutional courses: these are PhD courses of 20 hours, planned in advance and regularly distributed across the various fields of mathematics. The course will have a final exam (which must include at least an oral exam and the submission of exercises) and will be graded on a scale of thirty. Each course will be worth 4 doctoral credits. The teaching will be delivered by faculty members or external lecturers, and as far as faculty members is concerned, the hours will be counted for their individual teaching load.
 - b) Regular courses: these are both basic and advanced courses, which will be delivered by faculty members as well as external lecturers. For courses offered by faculty members, the minimum duration is 10 hours, while for external lecturers, the duration should generally be minimum 5 hours. All courses must have some form of final exam (even in the form of a seminar) that results in a pass/fail evaluation. One doctoral credit will correspond to 5 hours of teaching.

Training activities provided through the Master's degree in Mathematics may also be recognized, up to a maximum of 12 credits.

- Disciplinary seminars with independent study: one credit will be awarded for every 15 hours of attendance (small adjustments may be possible to achieve a whole number). Attendance will be certified by a faculty member who will act as the responsible supervisor for the seminar series to the PhD board.
- Working groups: The groups may also be organized autonomously by the students, with the presence of a faculty member acting as the formal supervisor of the activity. Considering the

individual study required, 10 hours of attendance will be counted per credit. It is mandatory for the recognition of these credits to report at least once in front of the working group.

Soft skills

Credits will be earned through attendance at specific courses. Required credits aimed at developing soft skills during the Master's degree program may also be recognized.

Extra-curricular training

- PhD Schools: as these are teaching activities without a final learning assessment, only participation will be counted. For each day of the school, 10 hours of attendance will be counted, resulting in 2 doctoral credits for 5 days of school. If there is a final learning assessment with a European credit recognition system, only those credits will be recognized as disciplinary training.
- Organization of conferences: the hours spent on the actual organization of the conference will be counted, and these must be certified by a responsible faculty member. A reasonable estimate of the time spent is necessary; typically, organizing a single conference does not result in the achievement of a doctoral credit. Any hours obtained in this way can be combined with other extra-curricular activities.
- Doctoral symposia: these are socialization and sharing events aimed at PhD students, organized by the doctoral board, such as peer poster presentations. For these, only attendance will be counted, estimated at 5 hours for each half-day of activity. If this activity is counted as part of the annual transition, no credits can be recognized.

Dissemination activities

- Participation in conferences: only the hours of attendance will be considered, estimated at 10 hours per day of conference. In this way, a 5-day conference will result in 2 doctoral credits.
- Seminars: seminars at UniBO or other universities, research centers, or conferences will be counted. One doctoral credit will be awarded for each 2 days of seminars. For rounding purposes, any unaccounted hours from previous years can be used.

Supplementary teaching and tutoring

Tutoring and supplementary teaching activities: for tutoring activities, a proportion between the number of hours spent in class and doctoral credits will be considered, taking into account the heterogeneity of tutoring activities and in relation to the hours of teaching and academic credits in the course where the tutoring occurs. 15 hours of tutoring will be required for one doctoral credit.

Teaching support activities: for these activities, the hours spent preparing teaching materials and the work of collecting and organizing such material will be counted. The time commitment will be quantified by the supervising faculty member. By law, a limit of 40 hours per year is set (DM 226/21), with a maximum of 1 credit per year.

Information on the equivalencies between activities and credits is summarized in the following Table D:

| Table D – Correspondence between workload hours and acquired DCs | | | | |
|---|--------------------------------|-------------------------|--------------------|------------|
| Type of activity | Hours in class | Self-study hours | Total hours | DCs |
| Disciplinary and multidisciplinary training | | | | |
| Disciplinary seminars that require self-study | 15 | 10 | 25 | 1 |
| Seminars that do not require self-study | 25 | 0 | 25 | 1 |
| Working groups | 10 | 15 | 25 | 1 |
| Disciplinary and multidisciplinary training courses | 5 | 20 | 25 | 1 |
| Soft skills | | | | |
| Courses for soft skills | 8 | 17 | 25 | 1 |
| Teaching | | | | |
| Supplementary teaching | 20 | 5 | 25 | 1 |
| Tutoring | 15 | 10 | 25 | 1 |
| Extra-curricular training | | | | |
| Organization of conferences | 20 | 5 | 25 | 1 |
| PhD Schools | 2,5 days (each day = 10 hours) | | | 1 |
| Doctoral symposia | 2,5 days (each day = 10 hours) | | | 1 |
| Dissemination | | | | |
| Participation in conferences | 2,5 days (each day = 10 hours) | | | 1 |
| Seminars | 2 days (each day = 10 hours) | | | 1 |

NOTE: For activities where the organizer explicitly defines ECTS according to a scheme that complies with the general criterion 1 ECTS = 1 DC = 25 hours, the proposed recognition of DC will generally be considered, even in deviation from the criteria in the table.

Example 1: Activities without tutoring

Disciplinary and multidisciplinary training:

85 hours of courses, 5 hours per credit = 17 DCs

Attendance of disciplinary seminars for 15 hours each year = 3 DCs

Self-organized working group among doctoral students (10 meetings of 3 hours) = 3 DCs

Total for training: 23 DCs

Soft skills:

Attendance of courses “PhD Information Literacy, Open Access & Copyright Workshop”, “Knowledge valorisation and technology transfer to create impact on society” and “Open Science: research data management principles and practices” = 3 DCs

Extra-curricular training:

Attendance of three 5-day PhD schools = 6 DCs

Dissemination activities:

Attendance of two 5-day conferences = 4 DCs

Teaching:

Nothing

Total: 36 DCs

Example 2: Moderate tutoring, few seminars and no working groups

Disciplinary and multidisciplinary training:

100 hours of courses, 5 hours per credit = 20 DCs

Attendance of disciplinary seminars for 5 hours each year = DCs

Total for training: 21 DCs

Soft skills:

Attendance of courses “PhD Information Literacy, Open Access & Copyright Workshop”, “Knowledge valorisation and technology transfer to create impact on society” and “Open Science: research data management principles and practices” = 3 DCs

Extra-curricular training:

Attendance of two 5-day PhD schools = 4 DCs

Dissemination activities:

Attendance of a 5-day conference = 2 DCs

Teaching:

30 hours/years of tutoring = 6 DCs

Total: 36 DCs