

University of Debrecen
Doctoral School of Physical Sciences
Quality Assurance Regulations

Quality Assurance

In the Doctoral School of Physical Sciences (DS) the doctoral training and the award of the doctoral degree are conducted within the framework defined jointly by the Doctoral Regulations (DR) of the University of Debrecen (UD), the regulations on doctoral training and degree award of the University's Doctoral Council for Natural Sciences and Engineering (DCNSE), and the Organisational and Operational Rules (OOR) of the School. Within the Doctoral School, training takes place in five programmes, which operate within a unified system under the direction of the Doctoral School Council (DSC). Strict adherence to these regulations ensures the quality of the doctoral training.

The basic principles of the DS's quality assurance system are in accordance with the University's quality assurance system, as set out in Annex IX of the Quality Assurance Handbook of the University of Debrecen.

Accordingly, the DSC elects the Quality Assurance Manager (QA Manager) of the DS, who is appointed by the Head of the DS. Quality assurance documents pertaining to the Doctoral School are prepared by the QA Manager, reviewed by the Head of the DS, and submitted to the DCNSE for approval.

The DS operates a quality assessment system described in this document. The University Doctoral and Habilitation Council (UDHC) defines annual quality objectives and compulsory indicators at its first meeting of each year. Taking these into account, the DSC also defines the School's quality objectives and indicators annually. The documents are submitted to the DCNSE for approval. At the end of the year, the Council of the Doctoral School — with the operational involvement of the QA Manager — collects and evaluates the fulfilment of the quality objectives and the data of the indicators, and submits these to the DCNSE.

The DS has established its performance evaluation system, according to which the DS continuously monitors the active publication performance of doctoral candidates and their supervisors. In its operation, the DS applies the PDCA cycle: it plans its activities, implements the objectives recorded in the plan, applies control tools to examine compliance with the objectives, and adjusts its operation as necessary based on the monitored indicators. From a quality assurance perspective, the DS follows the self-assessment guidelines of the Hungarian Accreditation Committee (HAC).

1. Accreditation of Academic Staff

The DSC evaluates the professional background of applicants with a scientific degree who wish to join the teaching staff of the Doctoral School, and decides on the approval of their accreditation. The accreditation must then be approved by the University's Science and Technology Doctoral Council. During the evaluation, the following aspects are considered: previous university teaching activity (lectures, seminars), supervision of BSc/MSc theses, and supervision of student research (TDK) work. The DS aims to ensure that only academic staff who have completed habilitation at the University or who meet the University's habilitation requirements may become members of the School. As part of the evaluation, the DSC reviews the applicant's full publication list and their ten most important publications, including their impact on the scientific community, the impact factor of the journals, and their SCImago ranking. The applicant must also submit a proposal for a research topic and/or for teaching a course, which is likewise evaluated by the DSC.

The academic staff of the DS appear on the School's website and in the database of the National Doctoral Council (NDC). If an academic staff member teaches in multiple doctoral schools, they must declare on the NDC profile what percentage of their activities belong to each doctoral school.

2. Announcement of Doctoral Research Topics

A detailed description of the research topics approved within the DS, as well as a summary table, can be found on the DS website.

Any academic staff member of the DS may announce a doctoral research topic and thereby become a topic proposer; however, before the topic is announced, the DSC evaluates each submitted topic and approves only those for which the intellectual and infrastructural background of the research is ensured, and for which it considers realistic that a high-quality dissertation suitable for pre-defense can be submitted within four years. The DSC examines whether the proposer's research and publication activity in the preceding five years is adequate for supervising doctoral work.

Since 2014, the DS Secretary and the Head of the DS prepare, before each admission examination, a report on the degree-award processes of the preceding ten years, which the DSC discusses in order to avoid repeated unsuccessful supervision cases.

The HUN-REN Institute for Nuclear Research (Atomki) is a founding member of the DS, under a cooperation agreement with the Doctoral School. A significant proportion of the founding members are researchers from Atomki. Their participation is justified by their long-standing contributions to doctoral training as an affiliated institution of the University, and by the fact that Atomki's modern research equipment, instruments and extensive international collaborations offer excellent opportunities for involvement in cutting-edge research topics. Supervision conducted in Atomki takes place within the framework of this cooperation agreement. Students'

employment relationships at Atomki are clearly regulated, and their rights and obligations are well defined.

A topic proposer becomes a supervisor when an applicant admitted to the DS enrolls in the announced topic. Doctoral candidates work under the direction of their supervisor. Each student is assigned one supervisor, who bears full responsibility for guiding and assisting the student's studies, research work, and preparation for obtaining the degree. Due to retirements, a generational renewal is taking place among the supervisors of the DS. Co-supervision occurs only in exceptional cases (e.g., interdisciplinary research areas or doctoral training conducted within international collaborations). In such cases, the co-supervisor is not a member of the DS. Requests for co-supervision must be reviewed by the Head of the DS before submission to the DCNSE. During the admission examination, the DSC ensures that no supervisor is assigned more than three students at the same time.

3. Admission to Doctoral Training

Admission to the doctoral school is only possible by applying to the nationally announced call published on the website www.doktori.hu followed by a successful interview conducted by the admission committee. The admission procedure of the Doctoral School is regulated by the School's Organisational and Operational Rules (OOR). In essence, during the physics doctoral admission process, the School follows the rules laid out in the regulations of the Doctoral Council for Natural Sciences and Engineering (DCNSE).

In the first category of admission points, the committee evaluates the candidate's professional preparedness, the plans related to the research to be carried out during doctoral studies, and the soundness of these plans. This is assessed during the oral examination and on the basis of the written application and research plan submitted with the application for admission. On the admission application form, the candidate must provide confirmation of the supervisor's and hosting unit's willingness to accept them. The second category reflects the candidate's previous academic results, assessed through the evaluation of the BSc/MSc degree. If the degree was issued more than two years prior, its grade does not count toward the admission score. The third category serves to evaluate the candidate's prior scientific activity ("scientific background"), where documented achievements (publications, conference papers, awards, etc.) earn points. The foreign language requirements for admission are specified in the OOR of the Doctoral School. Any language proficiency beyond the minimum requirement may be rewarded with bonus points by the admission committee.

4. Courses of the Doctoral Training

The acceptance of courses into the training programme, as well as the renewal of course syllabi, is decided by the Doctoral School Council (DSC). The training plan of the DS, the summary table of courses, and the detailed course descriptions are available on the DS website. At the beginning of each semester, the Head and the Secretary of the School inform the students about the new

courses, and during the semester the DS Secretary also calls students' attention to these via electronic messages.

The supervisor provides primary guidance in selecting the courses to be taken by the doctoral candidate. The purpose of the courses attended is, on the one hand, to support preparation for the doctoral comprehensive examination and the theoretical part of the Complex Exam, and on the other hand, to enable doctoral students to acquire the specific knowledge necessary for their research work. Doctoral students may choose not only among the courses announced within their own programme, but also among courses announced in the other programmes of the DS. Thus, the full potential of the School is available to all students. In addition, within a certain proportion, students may take any doctoral course offered by the University of Debrecen or by other universities as freely elective subjects.

5. Research Work

The supervisor bears full responsibility for directing the research work of the doctoral student. Due to the characteristics of the scientific field, research in the DS may take the form of basic research and/or applied research, and may include theoretical work, experimental research, as well as equipment or instrument development. A unified requirement is that the expected results of the doctoral student's assigned research task, and the research carried out by the student, must reach a level that is suitable for publication in an international scientific journal with an impact factor, and for presentation at an international conference.

The DS and the supervisors create opportunities for every student to present at least one professional talk per year on their research results, preferably at an international conference, and to visit a foreign university or institute where research related to their topic is conducted. To support this, the DS provides travel funding to the extent possible, calls students' attention to mobility grants, supports students' applications for such grants, and provides the necessary information and documentation required for submitting applications. Where possible, the DS itself applies for projects that support the professional travel of doctoral students. Supervisors are also responsible, where possible, for applying for research projects that support the international visibility of the students. The Institute of Physics of the University of Debrecen and Atomki have good track records in obtaining grants. Their numerous research projects and extensive international collaborations greatly support the participation of doctoral candidates in the DS in international conferences and foreign research visits.

The full infrastructure of the departments and institutes is available to every doctoral student for conducting productive research. Depending on usage, this infrastructure is supported in part by state funding allocated for doctoral training. The majority of the state funding allocated for doctoral training is managed by each programme in proportion to the number of students enrolled in that programme. However, on several occasions, funding for larger investments has been provided without distributing the resources across programmes. The programme leader and the

supervisor jointly determine how the funding allocated for a given student can be used most effectively for the purposes of training.

The distribution of state funding per student is carried out using the established automated procedure: after a minimal deduction for central purposes, the remaining amount is distributed among the programmes in proportion to the amounts “brought in” by their students. This does not exclude the possibility that, when necessary, investments serving common goals may be implemented.

6. Monitoring

In the six-semester training programme, in order to continuously monitor student progress, students are required to submit a written annual report in which the student and the supervisor summarise the scientific and academic activities carried out during the given year. Students enrolled in the eight-semester training programme must submit a similar report at the end of their first and third academic years. The report can be downloaded from the DS website and is completed using the form that is part of the OOR. For students in the six-semester programme and for first-year students in the eight-semester programme, the document includes the academic credits earned during the given year; for all students, the report summarises research results, including publications related to the doctoral work, conference and seminar presentations, as well as descriptions of professional trips undertaken since the previous report.

As part of the assessment of research performance, doctoral students enrolled in the eight-semester programme must present the progress of their research work in a short talk at the PhD Professional Day organised by the DS at the end of their first and third academic years. The purpose of the workshop is to provide the DSC with an overview of students’ preparedness for the Complex Exam and for the pre-defense, to identify any arising problems, and to formulate professional recommendations for the student and the supervisor in order to facilitate the timely and successful completion of the degree.

Based on the presentation and the written professional report, the DSC evaluates the work of the student and the supervisor and decides on the completion of the course titled “Annual Report”, which carries 0 credit points. If the DSC identifies a problem, it may propose changes to the research topic or to the supervision.

Students enrolled in the eight-semester training programme take the Complex Exam at the end of the second year — closing the training and research phase and serving as a prerequisite for commencing the research and dissertation phase. The Complex Exam provides a comprehensive assessment and evaluation of the student’s academic and research progress.

In the National Doctoral Database, the steps of degree acquisition, the activities of supervisors, and the work of the DS are documented. The supervisors and the DS Secretary are responsible for entering the data.

Tracking the careers of graduates is particularly feasible for those former doctoral students who continue working in research. Overall, the employment opportunities of graduates of the Doctoral School are favourable. Due to the rapid industrial development of Debrecen and its wider region in recent years, companies have been established that conduct not only manufacturing but also production development and research-and-development activities. These companies employ an increasing number of specialists with a PhD degree, which provides especially strong employment prospects — both for international postdoctoral opportunities and for domestic positions — in the Solid State Physics and Materials Science Programme and in the Programme of Physical Methods in Interdisciplinary Research.

With the launch of the ELI-ALPS research centre, employment opportunities have also significantly expanded for graduates of the Atomic and Molecular Physics Programme. In addition, newly announced ministerial and academic postdoctoral grants have further increased the number of domestic research positions. The MTMT publication-and-citation database also offers excellent opportunities for tracking graduates' careers, as it remains accessible to students even after graduation. Existing data already show, for example, the extent to which graduates of the Doctoral School contribute to the scientific output of the Institute of Physics of the University of Debrecen and of Atomki.

7. Publication Requirements for the Doctoral Degree

Within the DS, the programmes operate in a unified system under the direction of the DSC, which has also established the requirements necessary for obtaining the doctoral degree, in accordance with the University's Doctoral Regulations (DR). In the Doctoral School, the dissertation must be based on 3–4 published papers (which may include papers published in conference proceedings), of which at least two research articles must be published in international journals with an impact factor. Among the publications forming the basis of the dissertation, if permitted by the scientific field, the doctoral candidate must be the first author of at least one. Publications in conference proceedings must be at least four pages in length.

In some cases within our DS, doctoral students conduct their research within large international collaborations. When submitting the dissertation, the candidate must attach a written statement, bound into the dissertation, signed by both the candidate and the supervisor, declaring that the scientific results described in the thesis statements do not constitute part of any other doctoral dissertation. Furthermore, the DCNSE regulations require that if two doctoral candidates are co-authors of a publication, the supervisor must provide a statement indicating to what extent (in percentage terms) the results used in the dissertation reflect the contribution of the respective candidate.

In recent years, several highly prepared students have applied for admission with already accepted publications that were produced during their MSc thesis work. It is hoped that this favourable trend will continue.

8. Complex Exam

The website of the Doctoral School provides detailed information on the content of the Complex Exam, the examination topics, and the procedure of the examination. To support preparation, at the beginning of the semester in which the Complex Exam takes place, the Head of the Doctoral School gives a detailed oral briefing to the examinees, in which he/she explains the procedure of the examination and the requirements of the Doctoral School.

To fulfil the dissertation component of the Complex Exam, the student must have at least one scientific publication that has been published in, accepted for publication by, or submitted to a journal indexed in the “Web of Science” database. Fulfilment of this requirement must be demonstrated either by presenting the publication itself or by providing documentation issued by the journal’s editorial office.

If meeting the publication requirement is not possible due to the specific nature of the research field (for example, the internal rules of a large collaboration), the student and the supervisor may request an exemption by submitting a written justification. The examination committee may grant the exemption if it is convinced that the student will be able to meet the requirements for degree award by the time of the pre-defense.

9. Degree Award Procedure

Before applying for the public defence, every student must present their research results and doctoral dissertation at a successful pre-defense. The website of the Doctoral School provides detailed information on the conditions for applying for the pre-defense as well as the rules governing its procedure. To support preparation, at the beginning of each semester, the Head of the Doctoral School gives a detailed oral briefing to the involved students, summarising the most important information related to the pre-defense.

A prerequisite for conducting the pre-defense is the fulfilment of the minimum publication requirements for the doctoral degree, in such a way that the required publications must have been submitted for publication by the date of the pre-defense.

The chair and members of the pre-defense committee are appointed by the Council of the Doctoral School in accordance with the regulations, after which the review is conducted and the result is reported to the DCNSE. Students enrolled in the eight-semester training programme receive credit points for the successful pre-defense, which count towards the completion of the absolutorium. The pre-defense committee consists of three members: the chair, an internal reviewer, and an external reviewer who is not a member of the DS teaching staff. All members of the committee hold a scientific degree.

The dissertation submitted for the pre-defense undergoes a text similarity check performed by the DS Secretary before the evaluation. The document containing the results of the similarity check is forwarded by the DS Secretary to the reviewers. In their evaluation reports, reviewers are required to declare whether, based on the available data, the dissertation meets the requirements

of publication ethics. The pre-defense may be conducted even if the reviewer(s) raise ethical concerns, provided that any issues identified can be corrected in the final dissertation without academic consequences. If a reviewer raises an ethical concern during the pre-defense, the Head of the DS shall inform the DCNSE of this when the final dissertation is submitted.

A report and an attendance sheet are prepared on the pre-defense. To facilitate documentation, when appointing the committee, the Head of the DS requests the committee chair to carry out the documentation of the review: recording the minutes (including, among other things, the questions asked of the doctoral candidate and the committee's opinion), ensuring that the attendance sheet is signed, and collecting the signed reviewer reports. To assist documentation, the DS has prepared standard forms for the minutes and the attendance sheet, which are provided by the DS Secretary to the chair of the pre-defense. After the review, the attendance sheet, minutes, and reviewer reports are forwarded to the DCNSE by the DS Secretary.

In accordance with the DR of the DCNSE, the Council specified in the OOR the foreign language requirements necessary for obtaining the doctoral degree, in addition to the publication requirements.

Regarding the steps leading to degree award, the Doctoral School fulfils its announcement obligations as follows: the comprehensive examination / Complex Exam / pre-defense / public defence is announced on the website of the Doctoral School, on the notice boards of the physics departments of the University of Debrecen and of the HUN-REN Atomki, and via electronic circulars sent to the entire professional community in Debrecen. Public defences are also announced in the National Doctoral Database at www.doktori.hu. Publication of the defence announcements on behalf of the DS is the responsibility of the DS Secretary. The public defences are published in a newsletter by the Scientific Directorate of the University of Debrecen.

The DS also follows the rules laid down in the DR and the DCNSE regulations for conducting the public defence. The organisation of the defence is the responsibility of the DCNSE.

When announcing the defence, the dissertation, the Hungarian and English thesis booklets, as well as the candidate's publication list maintained in MTMT, become publicly accessible on the website of the DS and in the National Doctoral Database at www.doktori.hu. Uploading these materials is the responsibility of the DS Secretary. At the time of announcement, the dissertation and the thesis booklet must be deposited in the electronic archive of the University Library (DEA). This is to be carried out by the doctoral candidate. One printed copy of the dissertation and of the thesis booklet is also placed in the University Library.