Self-assessment

2025

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I. Self-assessment

I.1 General, organizational and quality assurance characteristics

Basic information about the doctoral school

s) operating the doctoral school	University of Szeged
Doctoral school name	Doctoral School of Environmental Sciences
Doctoral school name in English	Doctoral School of Environmental Sciences
Doctoral school address	H-6720 Szeged, Dugonics Square 13.
Address of the planned website of the doctoral school	https://sci.u-szeged.hu/kutatas/doktori-iskolak/kornyezettudomanyi-doktori-iskola
Doctoral school ODT identifier	KDI3-SzTE MAB identifier: 121
Year of start of doctoral training	1993
Head of Doctoral School	Zoltán Konya
Language(s) of doctoral training	Hungarian and English
Doctoral training schedule(s) (full-time, correspondence, individual preparation)	daytime and individual preparation
Doctoral school classification by discipline	natural sciences
Doctoral school discipline(s)	environmental sciences
including: research/art field	basic and applied research in environmental science and environmental protection, with particular attention to the biological, physical, geographical, geological, chemical, food industry and technological sub-fields
Name of doctoral program(s) and indication of their leaders (if any)	Environmental Biology (Zoltan Bátori) Environmental Earth Science (Elemér Pál-Molnár) Environmental Chemistry (Zoltan Konya) Environmental Physics (Zoltan Bozóki) Environmental Technology (Cecília Hodúr)
Name of the heads of doctoral program(s) (if any)	Zoltán Bátori (Environmental Biology) Elemér Pál-Molnár (Environmental Earth Science) Zoltán Kónya (Environmental Chemistry) Zoltán Bozóki (Environmental Physics) Cecília Hodúr (Environmental Technology)
Name of doctoral degree(s) awarded (DBA, DLA, PhD)	PhD

I.1.2 Profile, management, operation and competitiveness of the doctoral school

(In what institution, with what leadership, number of staff, how long has the doctoral school been operating, and with what level of autonomy? What is its brief history? What are the specific features and main strengths of the doctoral school? Place it on the palette of Hungarian and international doctoral schools: what does it offer more, better, or different than other doctoral schools with a similar profile, with particular regard to international competitiveness?)

The predecessor of the Faculty of Science of Szeged, the Faculty of Natural Sciences of the József Attila University of Science, already wanted to establish a doctoral program in environmental science during the accreditation of doctoral programs in 1992, based on the environmental science research that had been going on for several years. In its requested position statement, the MAB abstained from the accreditation of the doctoral program in environmental science, therefore, the following doctoral programs related to environmental science received their accreditation, linked to the scientific fields that were acceptable at that time:

I. **Environmental Biochemistry and Biotechnology Program**
II. **Conservation Ecology Program**

III. **Geographical and geological analysis of regional processes program**
- III./1. *Geomorphological and geoecological assessments*
- III./2. *Problems of urban climate and air pollution today*

IV. **Environmental Chemistry Program**
- IV./1. *Environmental Chemistry and Analytics*
- IV./2. *Environmental Chemical Technology*
- IV./3. *Colloidal systems in environmental chemistry*

V. **Environmental Geology Program**

During the period of the regime change, the postgraduate training in environmental protection was also launched, which is still ongoing and nearly 700 professionals have participated in the training so far. This was followed by the introduction of the environmental science teacher and then the environmental science major in full-time undergraduate training. With the transition to the Bologna system, the University has accredited the environmental science and environmental engineering undergraduate training, the environmental science and environmental teacher master's training and the environmental engineering master's training are in the process of being launched. These majors represent and continue to represent the professional foundation of the doctoral training.

In the doctoral programs already listed, until the structural transformation of organized training in 2001, 169 students participated in doctoral training and 124 of them ultimately obtained their degrees.

In the Doctoral School of Environmental Sciences, established in 2001, the above programs were integrated and the training offer was expanded with new programs as follows:

I. **Environmental Biochemistry and Biotechnology** (Dr. János Nemcsók, professor)
- I./1. *Environmental Biochemistry* (Dr. János Nemcsók, professor)
- I./2. *Biotechnology* (Dr. Kornél Kovács, professor)

II. **Conservation Ecology** (Dr. László Gallé, professor)

III. **Environmental Geography** (Dr. Gábor Mezősi, professor)
- III./1. *Geomorphological and geoecological assessments* (Dr. Gábor Mezősi)
- III./2. *Problems of urban climate and air pollution today* (habil. Dr. Keveiné, Dr. Ilona Bárány, associate professor)

V. **Environmental Geology program** (Dr. Magdolna Hetényi, academician, university professor)

VI. **Environmental Physics** (Dr. Gábor Szabó, academician, university professor)

VII. **Environmental Chemistry Program** (Dr. Imre Kiricsi, professor)
- VII./1. *Environmental Chemistry and Analytics* (Dr. András Dombi, Associate Professor)
- VII./2. *Environmental Chemical Technology* (Dr. Imre Kiricsi, professor)
- VII./3. *Colloidal systems in environmental chemistry* (Academician Dr. Imre Dékány)

At this point, we must also remember the late Professor Kálmán Burger, a full member of the Hungarian Academy of Sciences, whose persistent, steadfast, purposeful and consistent activities resulted in the formation of the organization that still functions well today. After his death, Professor Imre Kiricsi took over.

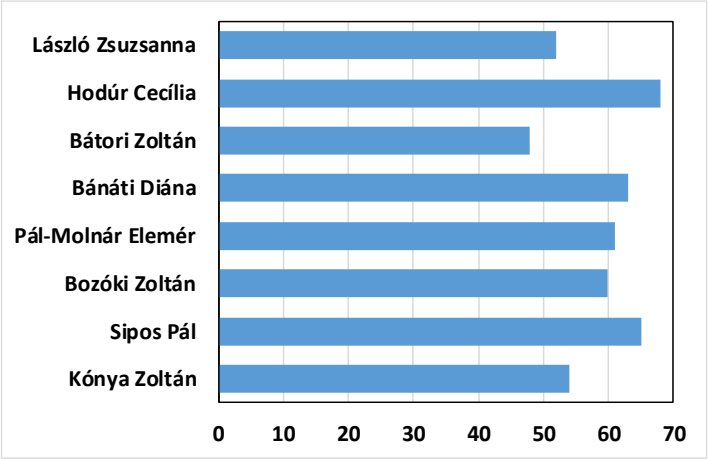
In recent years, changes have also occurred in the structure of the doctoral school and the doctoral programs. After the death of Imre Kiricsi, the leadership of the Doctoral School was taken over by Professor András Dombi, who then handed over the task to Zoltán Kónya, under whose leadership similar meaningful and fruitful work is being carried out in the doctoral school as before. Instead of Professor János Nemcsók, Dr. Gábor Rákhely, together with Academician László Vigh, became the head of the *Environmental and Biotechnology program.* Instead of Professor Gábor Mezősi, Dr. János Rakonczai became the head of the *Environmental Geography program. The subprograms in* the *Environmental Chemistry program* have grown into independent programs. The demand for applied research, the scientific rigor and thoroughness of the research in the field justified the establishment of the *Environmental Engineering program* under the leadership of Professors Dr. István Hannus and Dr. Cecília Hodúr. Thus, education and research at KTDI continued within the framework of the following programs until 2025:

1. **Environmental Biochemistry and Biotechnology** (head: Dr. Gábor Rákhely, associate professor)
2. **Conservation Ecology** (head: Dr. Zsolt Pénzes, associate professor)
3. **Environmental Geography** (leader: Dr. János Rakonczai, professor)
4. **Environmental Geology Program** (Head: Dr. Pál Molnár Elemér, Associate Professor)
5. **Environmental Physics** (head: Dr. Zoltán Bozóki, university professor)

6. **Environmental Chemistry and Analytics** (leader: Dr. Pál Sipos, university professor)
7. **Environmental Chemical Technology and Materials Science** (head: Dr. Zoltán Kónya, professor)

During the accreditation process in 2019, taking into account the comments of the MAB, as well as the number of PhD students belonging to each program and the publication activity in research topics related to the programs over the last 5 years, we considered it justified to merge certain research programs. In addition, we supplemented the DI's activities with a new area, Environmental and Food Safety. Thus, from 2025, education and research will be conducted within the framework of the following programs:

Environmental biology (program leader: Zoltán Bátori) - *By merging the Environmental Biochemistry and Biotechnology and Conservation Ecology programs*
Environmental Earth Science (program leader: Elemér Pál-Molnár) - *By merging the Environmental geography and Environmental Geology program with merger*
Environmental Chemistry (program leader: Zoltán Kónya) - *By merging the Environmental Chemical Technology and Materials Science and Environmental Chemistry and Analytics program*
Environmental Physics (program leader: Zoltán Bozóki)
Environmental Technology (program leader: Dr. Hodur Cecilia) - includes the topics of Environmental Technology and Food sciences



Age of KTDI core members

The aim of the organized training at the Doctoral School is to develop students' general knowledge of environmental science and, within it, specific, deep, organized and flexible knowledge covering the chosen research topic, the acquisition of which creates a solid foundation for systematic and creative problem solving and independent scientific work based on facts and evidence in the chosen narrower field of expertise. The aim of the training is to develop attitudes such as commitment to the profession and the search for new paths and the acceptance of the need for persistent work, as well as the responsibility and creative independence necessary for developing a leadership role, and the ability to debate. With the development of all these knowledge, skills and attitudes in mind, the training focuses on three main areas.

In the first main area, students take professional courses to deepen their professional knowledge. When compiling the courses, we aimed to include basic courses serving as general preparation, which introduce students to the basic knowledge of biology, physics, earth sciences and chemistry of environmental and nature protection. We consider courses presenting the legal, organizational, management and public health background of the field to belong to this circle. Some of these courses are also announced in the environmental science researcher and environmental science teacher training, and are recommended for those who do not have a basic degree in environmental science. The other part of the courses are special courses in environmental science disciplines and are closely related to the thematic training conducted at the School and to the topic announcements proposed by the supervisors. The third option for course-based training is to join courses announced by other scientific fields. In line with the spirit of reciprocity and universitas, as well as the

multidisciplinary nature of environmental science, we naturally also provide the opportunity for our students to take courses offered by other doctoral schools.

The second main and perhaps most important area of the training is the performance of research work. This is mainly done in the so-called *tutor* system, i.e. the student joins a research workshop of the doctoral school, and within it a teacher (theme supervisor), where an appropriate professional background, infrastructural background and funding are available, which together provide sufficient guarantees for the successful completion of the work. All this allows for the consideration of individual interests, individual abilities and attitudes and the adjustment of the research work to these. The preliminary standard control of the topics proposed for publication by the members of the doctoral school is the task and responsibility of the Doctoral School Council. The Council examines whether the topic to be published falls within the competence of the School, and whether the personal, material (equipment and instruments) and financial conditions for the development of the topic are available. Among the personal requirements, an important aspect is whether the topic has a public history on which the work is based, and whether the supervisor has a publication background that does not cast doubt on the publication of the student's results. This part of the training also covers preparation for the publication of professional results, such as writing papers and giving professional lectures. We strive to ensure that every student participating in the organized training also gets involved in the work of other domestic and foreign research workshops for a certain period (a few months).

Organized training is important, we consider it an almost essential element of professional preparation, so that students can get involved in graduate education by holding internships and seminars. We provide this opportunity and expect our students to carry out such educational activities for at least two semesters. Students receive credits for the educational activities they complete.

Potential students of the Doctoral School, in addition to students who have graduated in graduate environmental science, are mainly those with degrees in biology, physics, earth sciences and chemistry. Accordingly, we monitor the academic performance of students participating in undergraduate education in these fields at the University of Szeged and provide them with the opportunity to get involved in environmental science research as graduate students (for example, in the framework of scientific student club work or in the preparation of specialist and diploma theses). This is an effective way of pre-selecting suitable and worthy students for doctoral training. By taking advantage of the opportunities offered by electronic networks and the professional contacts of the instructors participating in the training, we also carry out appropriate information activities outside the university.

The final selection of deserving students will of course take place within the framework of an admission procedure. In the call for applications, which will be published in due time, we will announce the admission conditions in accordance with higher-level legislation and the assessment method to be used in the admission procedure, with the approval of the Doctoral School Council. The applicant submits his/her application for one of the subject areas announced by the school and may also provide the name of a potential supervisor. This supervisor will be involved in the relevant admission procedure as an observer. The applicable admission assessment is based on a point calculation and applicants will be ranked based on the scores achieved above a minimum score limit (50%). In cases where the admission will have a number of limitations (such as the number of those to be admitted for a state scholarship), the achieved admission score will be the decisive factor. The points to be obtained in the admission procedure are derived from three areas that are considered with approximately equal weight: the academic performance shown towards obtaining the diploma, the additional academic and research work shown during the undergraduate education, and the performance on the entrance exam on a predetermined topic. In the case of students who cover their scholarship and training costs from other sources, the financier is also involved in the decision-making process.

Comparing the programs of the Doctoral School of Environmental Sciences of the University of Szeged with those of other Doctoral Schools of Environmental Sciences in Hungary, its most important strength is that it offers training programs in the fields of chemistry, physics, earth science and biology, i.e. it provides a framework for very complex research and educational activities in accordance with the multidisciplinarity of environmental science. Among the Hungarian Doctoral Schools of Environmental Sciences, only the Doctoral School of Environmental Sciences of ELTE has a similar training program, i.e. among the rural doctoral schools, the Doctoral School of Environmental Sciences of SZTE can be called unique in this respect. Since both Serbia and Romania are close to Csongrád County, our doctoral school is also popular among young Hungarians abroad (most of whom graduate from the University of Novi Sad and the Babes -Bolyai University of Cluj-Napoca), the DI provides a further education opportunity for many young graduates from abroad. All this not only increases international competitiveness, but also provides an advantage in the application activities of the supervisors, which has a positive impact on the activities in the doctoral school, since research activities make up a significant part of the training of PhD students, which also requires financial resources.

Pál Juhász-Nagy Doctoral School, University of Debrecen	It has training programs primarily focused on biology, and the activities of the Department of Environmental Science are limited to the biology line of environmental science.
Doctoral School of Environmental Sciences, ELTE	Its programs cover all fields of science (Environmental Biology, Environmental Physics, Environmental Chemistry, Environmental Earth Science, Pál Kitaibel Multidisciplinary Program (Szombathely))
Pál Kitaibel Doctoral School of Environmental Sciences, University of West Hungary	Unaccredited doctoral school, no students
Doctoral School of Chemistry and Environmental Sciences, University of Pannonia	The programs primarily focus on areas of environmental science related to chemistry. (Air chemistry, Environmental mineralogy, Limnology, Toxicology, Behavioral ecology, Environmental chemistry of water and soil, Analytical chemistry, Separation science, Radiochemistry, Radioecology, Organic synthesis and catalysis, Bioorganic and biocoordination chemistry, Physical chemistry of condensed phases, Environmental and inorganic photochemistry)
Doctoral School of Environmental Sciences, Szent István University	The programs primarily focus on areas of environmental science related to ecology. (Soil science, environmental chemistry and microbiology, agrobiodiversity, gene conservation, organic farming, landscape ecology, nature and landscape protection, environmental safety)
Festetics Doctoral School, Hungarian University of Agricultural and Life Sciences	Within environmental sciences, its programs focus on crop and horticultural sciences and animal sciences.
Bachelor of Science in Environmental Science Hungarian University of Agricultural and Life Sciences	Within environmental sciences, soil science, environmental chemistry and microbiology, agrobiodiversity, gene conservation, organic farming, landscape ecology, nature and landscape protection, and environmental safety are its main areas of expertise.

I.1.3 The process of preparing the self-assessment report

(Who, within what process, in what division of labor, through what steps did the self-assessment and the self-assessment report be completed?)

The Self-Assessment was compiled by the KTDI Council, which regularly discusses and negotiates current issues, which may arise from the suggestions of students, supervisors, or lecturers, while continuously working towards the educational and research goals of KTDI. This continuous development strategy, as well as the fact that we keep our self-assessment (of which an important element is the professional report prepared by students and evaluated by their supervisors) up-to-date annually, is the basis for KTDI to be able to respond dynamically to the challenges of our time.
KTDI is also needed to prepare the report. The collection, verification and updating of this data is also the responsibility of the doctoral affairs staff of the Dean's Office of the University of Székesfehérvár, who monitor and administer the admission and training of students and also perform a significant part of the administrative work required for obtaining the degree.

I.1.4 Presentation and evaluation of measures taken based on the recommendations made during the previous accreditation procedure of the doctoral school

(The presentation may also include possible measures that may affect the doctoral school based on the recommendations of the previous institutional accreditation process.)

The MAB's decision No. 2020/3/VI/1/2, the University of Szeged accredited the doctoral school in environmental sciences with identification number 121, led by Zoltán Kónya, conditionally until April 9, 2025, subject to continuous provision of operating conditions, in conjunction with a monitoring procedure (https://www.mab.hu/hatarozatok/).

- KTDI complied with the minimum number of university professors, because the number of core members of university professors with the appropriate qualifications was 7.
- The majority of university professors met the requirements
- Operating rules: passed
- Training plan: passed
- Quality assurance plan: passed
- Website: passed
- The criterion of a meaningful and informative self-evaluation was met: The documents of the doctoral school were updated in September 2014. The operating regulations contain all the necessary information (admission procedure, credit regulations, conditions for obtaining the absolutorium, and publication criteria required for obtaining the degree). They allow for participation in individual training, but the admission criteria do not include any expectations for this. The training plan describes in detail the nine research programs, the subjects, and instructors of the training blocks. The **overlapping chapters of the operating regulations and the training plan are sometimes contradictory.** The website is informative and student-friendly. The self-evaluation and the C-SWOT analysis in it contain a correct, realistic analysis of the situation of the doctoral school.
- The research area of the core members, their publications, and the coherence between the DI training plan and the topic announcements, as well as the specified disciplines, was adequate: The research area of the doctoral school (basic and applied research in environmental science and environmental protection, with particular attention to the biological, physical, geographical, geological, chemical and technological sub-fields) indicates a very broad spectrum of environmental science. **At the same time, the scientific activity of the core members covers only a part of the listed fields; therefore, it is still recommended to focus the school's educational and research program on a narrower area. The announced topics are coherent with the school's research area, but the work of some core members/theme leaders is only marginally or indirectly related to environmental sciences.**
- The head of the doctoral school met the required conditions: The head of the doctoral school is Zoltán Kónya, Doctor of the Hungarian Academy of Sciences, university professor. His scientific activity is outstanding at an international level, and he has also played a significant role in educating future scientists. He meets the required conditions in all respects.
- The standard of the doctoral theses was adequate: The professional spectrum of the dissertations is extremely broad; however, the majority of the papers are of adequate standard. The theses are based on independent field and laboratory investigations or theoretical model calculations, the data processing is mostly of high quality, and the conclusions are mostly correct. The content and form elements of the thesis booklets meet the requirements. The **fact that there were also theses in which, in addition to the general expectations, the publication criteria prescribed by the doctoral school were not met indicates shortcomings in the control of the conditions for admission to the procedure.**
- It met the criteria for building on a master's degree
- The core member with degree-earning students met expectations
- Met the expectations regarding admitted students

Based on the MAB's proposals:

- We reviewed and improved the overlapping parts of the operating rules and the training plan.
- The training programs were reorganized – some programs were merged (I.1.2)
- Since the scientific activities of our core members do not fully cover the listed fields, we have tried to focus KTDI's educational and research program on a narrower area, or to cover the fields by involving new core members. At the same time, we consider that our topic announcers/topic supervisors, as well as the Hungarian and foreign instructors involved in the training, all contribute to the fact that KTDI's educational and research programs can cover such a broad spectrum.
- We have reviewed and clarified the process by which we examine the minimum conditions for a Candidate to be admitted to the procedure, so that it will no longer happen that someone does not meet the publication and other criteria required by the doctoral school.

2022 /8/VII/2, the Board of the Hungarian Academy of Sciences accepts the monitoring report following the accreditation procedure of the Doctoral School of Environmental Sciences (D121) operating at the University of Szeged and maintains the accreditation scope of the doctoral school until April 9, 2025. The validity of the resolution was extended on March 21, 2025, until September 30, 2026.

I.1.5 Environmental and social changes affecting doctoral school

(What are the difficulties independent of the institution that the doctoral school cannot influence but must take into account (change of maintenance, changes in student numbers, international trends in the professional field, etc.)? What external and internal constraints exist, and what is the doctoral school doing to mitigate the impact of the difficulties and constraints? How has the transition to the new doctoral training model (applicable from September 2016) affected applicants and their preparation for obtaining a degree?
What are the new perspectives and challenges arising from the international research legal environment and the new international requirements of interdisciplinarity? How can it respond to the problems of teamwork and individual student assessment? How does it adapt to the requirements of the European Research Area?)

Organizations must also contribute to solving global environmental and social problems, since a significant part of environmental use occurs in the processes of organizational operation (product production and service provision). A fundamental question is how and in what way these organizations can take an active and useful role in solving the problems. The SZTE Doctoral School of Environmental Sciences strives to meet these needs.
As of September 1, 2016, the duration of the training increased from 6 semesters to 8 semesters. In the new system, the training consists of two stages; at the end of the 4th semester, doctoral students must pass a complex exam. Further information on the new system of doctoral training and the general principles and rules of the complex exam can be found in the University Doctoral Regulations valid from 2025 (https://u-szeged.hu/doctoral/regulations/regulations-governing-250318), as well as on the website of the National Doctoral Council (https://doktori.hu/doktori-kepzes/doktori-iskolak/152-doctoral-school-of-environmental-sciences).

Before the SWOT analysis, we took into account the objective, external constraints that KTDI currently operates under and plans and develops its activities in the future.

C(onstraints): External constraints, conditions
The quality of doctoral training strongly depends on the preparedness of those participating in it. Given that the population of students currently entering higher education has significantly decreased (by half compared to the demographic peak represented by those born in 1975), this inevitably means a narrowing of the selection base. This is reinforced by the increased interest in other, popular competitive professions (output regulation), so a reduction in the selection of appropriate quality must be expected. We can hope for an increase in the reliability of selection (access to a master's degree is an additional screening opportunity) from students studying in the Bologna system entering doctoral training.
The other fundamental external factor is the contingency of research funding. In the past decade, the number of research grants announced has shown a very fluctuating trend, which does not change predictability and long-term stability in a good direction. For now, the probability of this trend reversing is small.
The third external factor is the decline in the “value” of Environmental Sciences in the economic and business sphere. This can only be changed by improving the quality of training and coordinated sectoral steps.

Our strengths, weaknesses, opportunities and internal constraints (threats, dangers) identified during the SWOT analysis, as well as the relationships between them, are presented below.

S(trengths): Highlighted areas
The doctoral training at the Faculty of Science and Informatics of the University of Szeged is perhaps our most significant and successful educational activity. This is reflected in the following:

1. The reputation and traditions of SZTE and TTIK
2. The Doctoral School's professional background is provided by numerous world-renowned researchers who have excellent scientometric parameters, professional networks, and funding sources.

3. It stimulates the instructors participating in the training to a high level of professional preparation. This inspiration was manifested in several areas. On the one hand, by holding organized courses, it was necessary to have comprehensive and up-to-date knowledge of the scientific field. On the other hand, continuous monitoring and following of the researched topic area is essential for cultivating the topic. This is manifested on the one hand in monitoring the literature, and on the other hand in continuous building of relationships with domestic and international research workshops.
4. The development of effective, interactive courses in small groups. Courses offered in the doctoral program are taken by only a few students, which allows students to actively engage in the course material by asking questions, discussing current topics, and exploring connections and points of connection with other subject areas.
5. The need to acquire professional literature more efficiently than before. The expected and effective way for doctoral students to prepare professionally is through individual preparation, which requires providing appropriate professional materials by purchasing the latest journals and professional books.
6. Active application activity to ensure the conditions for research. The material costs provided for the training of doctoral students with state scholarships are sufficient to cover only a fraction of the training expenses. The provision, development and operation of the research equipment park, which is essential for doctoral training, could be ensured almost exclusively from application sources. Additional funding was needed for the continuous replacement, maintenance and renovation of the equipment park, for the purchase of chemicals and other low-value equipment, journals and books and for the involvement of students in scientific public life (conferences, study trips). All of this can only be ensured through very active and efficient application activity.
7. Publication motivation. In order to successfully complete the doctoral training program with a degree, the candidate must demonstrate well-established and delimited publication activity. In addition to the candidate, the supervisor has a decisive role in this publication activity. For professional and moral reasons, this also motivates the instructors participating in the training to increase their publication activity, which is one of the most significant indicators of the scientific rank of the research workshop.

W(eaknesses): Areas to be improved

1. The competitive sector is not a sufficient motivation for financing doctoral training. In the organized training of our various doctoral programs, students receiving state scholarships and other scholarships participated in very different proportions. A significant proportion of the other resources acquired for this purpose also came from state-funded projects. However, the aim of doctoral training is to provide highly qualified professionals for the competitive sector, public administration and other areas in addition to ensuring an adequate scientific supply. However, to meet the needs of these areas, the financial resources of the applicants must also be involved. One of the most important lessons to be learned from the past period is to develop as broad a public relations (P+R) as possible to increase the proportion of resources in this direction.
2. Solving professional problems in the competitive sector. The vast majority of research conducted in our doctoral programs was of a basic research nature or research that laid the foundation for applications. In addition to attracting resources, the establishment of contacts, which has already been justified from other aspects, should also be aimed at exploring actual professional problems and bringing them into otherwise satisfactorily functioning research workshops.
3. Problems of replacing and renovating high-efficiency instrument parks. In natural sciences, it is necessary to have adequate tools and instrument parks to keep up with world standards. Although the past fifteen years have resulted in significant progress in this area, further developments are needed to cover the entire spectrum of investigations. On the other hand, our existing instrument park is significantly depreciating both physically and morally (obsolescence). Higher education, including our university, does not have sufficient resources to purchase the necessary equipment, and even in the case of possible applications, sometimes raising the so-called own funds is problematic. For their profitable purchase and operation, it is essential that they satisfy regional and national needs and, accordingly, that we also involve the resources of the applicants in their purchase. This is another argument in favor of broadening public relations.
4. Insufficient exploitation of the potential of international relations. During the operation of the Doctoral School of Environmental Sciences, the most significant progress occurred in the field of broadening international relations. Our accession to the European Union contributed greatly to these opportunities. With the increase in joint research cooperation, our cooperation in the field of organized doctoral training increased only to a lesser extent. This was less typical of our students' participation in part-time

training and study trips, but a relatively small number of students arrived from our foreign partners, although the conditions for this are also provided at our University and the Doctoral School of Environmental Sciences. The potential of such exchange training should be exploited to a much greater extent. The students who come to us are the best messengers and advertisers of our university, our city and our country. The relationships thus formed between future researchers, key professionals in the business sector and public administration will be fundamental and indispensable factors in building the future.

5. The decline in the prestige of the natural science profession. One of the most significant negative trends at our university in the past ten years is that, with the exception of computer science, interest in natural science professions and the preparedness of incoming students have decreased. However, we must learn the lessons that apply to us and doctoral training, and we must not neglect the things we can do in this area given our opportunities.
6. The current EU exclusions (Horizon, ERASMUS, etc.) are causing serious damage not only to the Doctoral School, but also to the entire Hungarian higher education and R&D sector, but we cannot do anything about it, we have to accept it.

O(pportunities): Development opportunities

The above shows what development opportunities the Doctoral School of Environmental Sciences can undertake within its own jurisdiction.

- Developing public relations with the competitive sector
    - for the purpose of financing students' studies,
    - to learn about research problems and offer research capacities,
    - creating instrument parks with the support of the private sector and conducting measurements.
- Expanding international relations
    - in order to involve foreign students in training,
    - more intensive participation in international tenders,
    - Exploitation of Hungarian-Romanian-Serbian regionality.
- Collaboration with other institutions for shared access to electronic databases.

T(hreats): Possible dangers

Among the threats threatening the Doctoral School of Environmental Sciences in the coming years, perhaps the most significant is the decrease in the number and preparedness of incoming students. Unfortunately, this is accompanied by signs of counter-selection among the lecturers. Another threat is that the age group of the KTDI is showing signs of aging, and the adequate replacement of the age group that has retired in recent years is problematic in certain fields. Ensuring an adequate supply of qualified students is a “brain drain” of the competitive sector) is facing increasing difficulties due to its activities.

Based on all this, KTDI's management summarized the most important elements of the strategy based on the results of the C-SWOT analysis:

	STRENGTHS	WEAKNESSES
OPPORTUNITIES	EL Strategy Developing joint training forms with companies (preparing tenders for these trainings) Prioritizing joint R&D&I projects with companies Exploiting CEEPUS, Erasmus teacher-student mobility Foreign language education	Gy -L Strategy Developing "PR" from various funding sources (e.g. R+D+I), Career tracking of graduates, leveraging the network of contacts Involving industrial partners in laboratory developments (Mercedes, MOL, etc.)
DANGERS	EV Strategy	Gy -V Strategy

	Involving young lecturers and researchers in the Doctoral School Extension of doctoral school-level application activities towards H2020 Involving young educators-researchers in R&D&I activities	Electronic curriculum development, providing internet access Involving lecturers and researchers in Doctoral School-level R&D&I applications Retaining retired instructors in training

Demonstrate the fulfillment of the following criteria:

I.1.6 The doctoral school has an officially accepted, regularly reviewed quality assurance subsystem developed with the involvement of external and internal stakeholders within the institution's quality assurance system, and is organically integrated with it.

(Who and in what procedure develops and reviews the quality assurance system covering the doctoral school? In the case of a unified institutional system, how does the doctoral school participate in this? Does it include, and to what extent, the self-assessment of members and student evaluations? How does the doctoral school involve various stakeholders in the development and further development of its quality assurance system? What are the main principles related to the quality management of the doctoral school? To what extent is the quality management system able to support the research methodology and quality objectives of researchers in research related to doctoral training?)

The quality management system of SZTE is a set of conscious and organized activities covering the entire University, which serves the constant approximation of the goals and actual operation of the University, which follow from the mission statement. Its focus is on satisfying the needs of direct and indirect partners (stakeholders), with particular regard to students, organizations employing those qualified at SZTE, employees, individuals and organizations using Research and Development services, international and domestic professional and scientific communities, as well as users of other services of SZTE [with particular regard to patients in the field of patient care], and other actors in the social environment. The quality assurance system of KTDI is organically aligned with the quality assurance principles and goals of SZTE.
The Quality Assurance Plan of the Doctoral School of Environmental Sciences (KTDI) of the University of Szeged is based on the principles and rules set out in the Doctoral Regulations of the University of Szeged, its part relating to the Faculty of Natural Sciences and Informatics, and the Operating Regulations of KTDI. The operation of KTDI is supervised by the Doctoral Council of Natural and Technical Sciences and the University Doctoral Council.
Taking into account the aspects specified in the Quality Assurance Plan, KTDI ensures the high standard of doctoral training and the doctoral degree acquisition process at all stages (from admission through doctoral studies to the preparation of dissertations and the degree acquisition). The quality assurance plan includes the method and framework for continuous monitoring of the requirements imposed on students and lecturers participating in doctoral training.
In line with the strategic development plans of the University of Szeged, the KAR (Research Administration System) was launched at the University of Szeged on October 11, 2021, thus making internationalization indicators available to our lecturers/supervisors, which allow them to specifically monitor and develop related competencies.

I.1.7 The procedures for implementing the quality assurance policy effectively ensure that managers, academics, non-academic staff and doctoral students take responsibility for quality assurance, protect the integrity and freedom of higher education and academia, and combat fraud, intolerance and discrimination.

(How do these procedures fit into the university's overall procedural system and how do they provide feedback for its improvement? What procedures ensure accountability of stakeholders? How and with what results do they combat fraud (e.g. ethical misconduct, plagiarism), intolerance and discrimination?)

Higher quality training is unthinkable without continuous monitoring and quality assurance. PhD students prepare a report every semester on their doctoral studies and the results related to them, including their research results, their presentation (conference participation, publication), the courses completed and their credits. This report is also signed by the supervisor and uploaded to the SZTE Coospace reserved space. The head of the DI and the administrator have access to the space, and they can review the reports. In this way, the Doctoral School can continuously monitor the student's progress. If it is unsatisfactory, it is also possible to change the topic or supervisor with the mutual consent of the supervisor and the student. In the complex exam, it is required that the supervisor gives an opinion on the student, which opinion the complex examination committee compares with the results and progress presented by the student. All this reduces the possibility of dropout and increases the conscious assumption of responsibility on the part of both parties (student and supervisor).
For Stipendium Hungaricum students, the supervisors declare every semester whether there is a conflict or complaint between the supervisor and the student. If so, the Doctoral School forwards it to the SZTE International and Public Relations Directorate.
The instructors encourage students to complete the instructor feedback questionnaire for the courses, which is available to students within the Neptun system. The summary of the evaluation can be viewed by all instructors, receiving clear feedback on their teaching activities. The OMHV questionnaires are also reviewed by the head of the DI at least annually, providing personalized feedback if necessary.
When submitting a doctoral thesis, the individual use of joint publications for the doctoral dissertation, as well as the issue of individual responsibility related to this, can be controlled and regulated with the help of co-authorship statements. Similarly, the appreciation and necessity of the value of scientific purity and individual work is reflected in the plagiarism screening of doctoral theses, which was introduced on a mandatory basis in 2022.
KTDI expects all its lecturers and students to be familiar with and adhere to the SZTE publication regulations (May 26, 2025, SZ-IX/2024/2025) and research regulations (Szeged, December 12, 2022, SZ-III/2022/2023/) (https://u-szeged.hu/szabalyzatok?&page1=6).

I.1.8 The doctoral school has a quality assessment system that effectively supports the continuation and further development of its educational and research/artistic activities, the professional development of teachers and doctoral students, and the appropriate level and standard of participation in international scientific/artistic life.

(What quality goals does the doctoral school set itself, to what extent have they been achieved, and on what indicators is their achievement measured? How does it determine the criteria for the competitiveness of the doctoral school? In the case of a unified institutional quality assessment system, how does the doctoral school form its subunit, how do the specific aspects of doctoral training prevail, and how does the doctoral school participate in the further development of processes? To what extent are the quality goals consistent with the criteria system of the documents IFT and Degree Change in Higher Education? How is the performance of doctoral students, lecturers, and doctoral school committees measured? How do the lecturer and student quality assessment and performance assessment systems build on each other?)

In line with the IFT, the doctoral school strives to be an incentive for its students in developing both international relations and relations with industry, and in facilitating communication with them. Students' participation in international conferences and summer schools is assessed with credits (training plan). Most of these are done through Campus Mundi and Pannónia mobility applications submitted by the student, as well as (mobility) applications provided by the supervisor.
Also, in line with the IFT, one of the international publications required for obtaining a doctoral degree can be replaced with a patent, which clearly demonstrates that the DI places great emphasis on involving PhD students in R&D&I activities.

I.2 Doctoral School Training Program

Demonstrate the fulfillment of the following criteria:

I.2.1 The doctoral school has formulated its mission

(Please describe the mission of the doctoral school in 1-3 sentences! How does this fit into the European research, national research and regional smart strategies?)

The Doctoral School of Environmental Sciences was established with the aim of providing high-quality doctoral students with degrees for higher education institutions and research institutes conducting natural science and technical training/research, as well as for policy institutions with appropriate social relevance.
The goal of our training program is to educate high-quality professionals who are capable of identifying scientific problems, analyzing them from a high-quality theoretical and methodological perspective, and then publishing the results appropriately.

I.2.2 The doctoral school has formulated its vision

(Please describe the vision of the doctoral school in 1-3 sentences! How does this vision fit into the institutional research vision and development objectives, as well as national and European policy objectives?)

Due to its interdisciplinary nature, DI places great emphasis on coordinating activities in different scientific fields, encouraging connections between them, and joint research, which clearly distinguishes it from DIs focusing on one scientific field. DI considers its mission to cultivate students' scientific activities at an internationally high level, and strives to promote their intensive connection with the needs of industry. The intensive involvement of foreign students in DI is also part of the vision.
The Smart Specialization Strategy (S3 – Smart Specialization Strategy) is a new type of specialized strategy that enables more effective support of research, development and innovation (R&D&I) processes and aims at the knowledge-based economic development of regions (nations, regions or counties). The main goal of S3 is to identify the local characteristics with the greatest potential, based on which national, regional and county priorities can be determined. In 2021, the following national economic priorities were determined:

- Cutting-edge technologies
- Health
- Digitalization of the economy
- Energy, climate
- Services
- Resource-efficient economy
- Agriculture, food industry
- Creative industries

KTDI's training and research portfolio covers 4 of these areas:

- Cutting-edge technologies
- Energy, climate
- Agriculture, food industry
- Creative industries

also connected (to a greater or lesser extent), which can support the survival and even development of the Doctoral School in the short and long term. In addition to the national economic priorities, two horizontal priorities have also been selected:

- Training, education
- Public sector and university innovation

KTDI is clearly linked to both priorities.

I.2.3 The doctoral school's training program is in line with the domestic and international research strategies of its field of study, the goals and strategy of the parent institution, and adequately supports the implementation of the doctoral school's mission and vision.

(What procedures ensure the above consistency? In the case of a multidisciplinary doctoral school, how is coherence ensured? If the institution has several doctoral schools in the same discipline, how does it differ from them, what justifies its independence? How is the doctoral school connected to the institutional programs and the goals defined in the institutional development plan? How are new research directions, methodological and research technological procedures researched, analyzed, discussed, decided upon and

incorporated into doctoral programs, and how does the renewal affect the research topics of the institutional bachelor's and master's programs and student research opportunities? How do the research directions support the domestic and international competitiveness of the doctoral school?)

Strengthening the international embeddedness of KTDI – in synergy with the institutional development strategic objectives of SZTE (SZTE IFT) – focuses on the following main areas: basic and applied research in environmental science and environmental protection, with particular attention to the subfields of biology, physics, geography, geology, chemistry and technology.
The Head of the Doctoral School of Environmental Sciences and his/her deputy have the right to represent the School in the University Doctoral Council and the Doctoral Council of Natural and Technical Sciences. KTDI lecturers regularly participate in doctoral activities (examinations, defenses) not only in their own but also in doctoral schools of related sciences as committee members and opponents.
From the perspective of KTDI's work, we consider it very important that our lecturers and students become active participants in large university and regional research programs, and in some cases, the studies of some students are even supported by these programs. Among these large programs, the joint research and development projects with MOL and AUDI, as well as the numerous GINOP/Market Focus Applications that have been won, are worth highlighting. The significance of this is also worth highlighting because in some cases, these programs address research needs arising in the region. Through this, doctoral students also gain insight into the activities of the private sector and develop useful relationships with private sector actors.
In the recent period, our supervisors and doctoral students have participated in/are participating in numerous GINOP programs - one of the pillars of our philosophy is that KTDI's research should be organically connected to realistic R&D&I problems.

I.2.4 The name of the doctoral school and doctoral program(s), as well as the title of the degree awarded (PhD/DLA), are consistent with each other and with the content of the training.

(If they are not in line, what is the reason for this and how do you plan to remedy the discrepancy? What proportion of the defended doctoral theses fall within the discipline, what proportion is in a border area, and what proportion is unrelated to the discipline? To what extent are the targeted research directions followed? What is the reason for any discrepancy? To what extent do the announced topics reflect the main directions of the research program?)

The names of our Doctoral School and our training programs, as well as the names of the degrees awarded, are consistent with each other and with the content of the training. The announced research topics adequately cover the main directions of the research programs, but of course there are also topics that represent border areas.

I.2.5 The training program is developed, adopted, regularly reviewed and developed based on appropriate analyses (labor market, enrollment, career tracking, scientific field, effectiveness), with the involvement of external and internal stakeholders (active and graduated students, doctoral students, lecturers, employers, etc.), within a transparent procedure.

(Which organizational units/other persons, how, and according to what procedure develop, evaluate and review the doctoral school's training program? What aspects, analyses, etc. are taken into account? How regularly does the doctoral council evaluate doctoral training and degree acquisition?
How were labor market and industry analyses used in shaping the doctoral program during the period covered by the self-evaluation, what were the results and findings of the career tracking activity, how were social and industrial actors involved in shaping the research program (e.g. in the form of focus group discussions, meetings, conferences, questionnaires) and what of the suggestions was included, what was left out, what changes occurred? What feedback did you receive from doctoral students or other stakeholders, and what changes did you make/plan to make based on this?)

The Doctoral School of Environmental Sciences is attended by lecturers from five faculties of the University of Szeged (in addition to the parent faculty, the Faculty of Natural Sciences and Informatics, the Faculty of General Medicine, the Juhász Gyula Faculty of Teacher Training, the Faculty of Agriculture and the Faculty of Engineering) as well as from external research institutes of the Hungarian Academy of Sciences (Natural Sciences Research Center and the Szeged Biological Research Institute). The management of KTDI maintains contact with the lecturers. Each unit is represented in the KTDI Council. Each program has a similar representation (given that every core member is a member of the KTDI Council). The daily tasks are carried out by the KTDI secretary, in coordination with the head of KTDI and his deputy. The lecturers and students are informed about all important elements of the life of KTDI partly on the KTDI website and partly through electronic notifications sent about important events. In the past year, in order to facilitate communication, we have created a separate interface on SZTE Coospace for the lecturers and students of the Doctoral School.
The basic pillar of the training, which is built according to the principles summarized in the KTDI Training Plan, is the research topic led by the supervisor(s). The research activity is also monitored by the KTDI Council during the presentations given at the annual doctoral symposium. The subjects provided by KTDI provide students with general knowledge and mainly serve to develop their competencies. The range of these subjects is wide and constantly expanding. In addition, KTDI is constantly examining and expanding the range of courses that match the students' research areas.

I.2.6 The learning outcomes of the training program are clearly stated and are in line with level 8 of the Hungarian Qualifications Framework.

Qualifications in the Hungarian Qualifications Framework

KTDI's training programs are by definition in line with the 8th level of the Hungarian Qualifications Framework. The individual professional theoretical courses and lectures (Appendix 2 of the training plan) are suitable for the development of subject knowledge, while during the individual courses offered by KTDI, students receive personalized mentoring from their instructors. These courses also aim to develop skills and abilities related to individual research tasks (specialty laboratory), participation in professional events, the acquisition of scientific debate skills (conference participation), and the evaluation and presentation of research results (Publication).

I.3 Resources

Demonstrate the fulfillment of the following criteria:

I.3.1 The doctoral school has the appropriate number of core members (at least as required by law). Core members hold a scientific/artistic degree relevant to the given doctoral school and engage in active, continuous, documented and successful research/artistic activities related to the training/research/artistic field of the doctoral school.

(How and why has the composition of the core members of the doctoral school changed? How does the doctoral school ensure that the number of core members does not fall below what is required by law or its own expectations? What research organization services do they use to support the international involvement and recognition of lecturers, and what knowledge management programs do they use to support the effectiveness of their teaching activities? Annex 1: List of core members of the doctoral school; Annex 2: Statement on the employment of the head of the doctoral school.)

Based on our regulations and the laws and regulations in force, the core members of KTDI are academics with a scientific degree, who are engaged in continuous, high-level scientific activity in the discipline or research area of the doctoral school, and who are employed full-time, in an employment relationship or in a civil service relationship at the University of Szeged. With the approval of the KTDI Council, a Professor Emeritus of SZTE may also be a core member. In addition, a scientific advisor or research professor with a scientific degree in one of the disciplines of KTDI, who are engaged in continuous, high-level scientific activity, who are employed full-time, in an employment relationship or in a civil service relationship at a research institute, and who hold the title of Doctor of the Hungarian Academy of Sciences may also be a core member, provided that SZTE has concluded an agreement with the research institute to this effect.

Doctoral School of Environmental Sciences	
Number of members	8
Number of emeritus members	8
Current number of topic posters	34
current number of supervisors	29
current number of instructors	133

I.3.2 The number of lecturers, supervisors and subject advisors is adequate. The professional requirements for them are clearly stated. The relevance and quality of their professional activities, as well as their workload, ensure adequate support for the scientific/artistic activities of doctoral students.

(What are the criteria for selecting lecturers, topic announcers and topic supervisors and evaluating their performance? How are lecturers' scientific/artistic activities in line with topic announcements monitored? In what ways are lecturers' professional development supported? How are student-centered aspects reflected in the requirements for topic supervisors? If the number of topic supervisors is insufficient, what measures have been taken to increase their number?)

Those lecturers and researchers with scientific degrees who are deemed suitable by the KTDI Council may perform teaching, thesis advisor and thesis advisor duties within the framework of the doctoral school. The fundamental criteria for selecting lecturers are the scientific field they work in, the quantity and quality of publications. In addition, when selecting supervisors, it is a criterion whether they have sufficient material resources, which are a necessary condition for the doctoral student's work. KTDI lecturers may announce courses within the framework of organized training. Lecturers may assume thesis advisor duties upon the recommendation of the KTDI Council and based on the decision of the doctoral council in the scientific field. The supervisor responsibly manages the doctoral candidate's studies and research. The work of the lecturers is evaluated annually by the KTDI Council based on student feedback, the work of the supervisors is primarily evaluated every two years by the head of the doctoral program, while the KTDI Council evaluates it every four years. The criteria include their own research performance, the research performance and degree-obtaining success of those supervised, and the continuity of financial resources.

I.3.3 The quantity, quality and accessibility of the infrastructure required for doctoral training (research/artistic activities, premises and equipment for teaching and learning, specialist literature, library, databases, IT systems) is adequate.

(To what extent is the library and information system suitable for supporting international scientific information services through international literature, databases, etc.? What platforms and services do doctoral students use to help them?) effectiveness and visibility of their research activities? How do they exploit the opportunities offered by distance learning and online systems? What data is collected regarding the use of the library and other infrastructure, and how is it used? Overall, how do they evaluate the infrastructural features of doctoral training?

It is advisable to group infrastructural conditions in two ways, according to the existence of general educational and research conditions.
The Central Library of the University of SZTE operates in the impressive building of the József Attila Information Center. Here, a collection of more than 10,000 books and journals directly related to environmental science and environmental protection, in printed and electronic form, is available to students. The number of items in the collection from allied disciplines related to environmental science is a multiple of the above. In addition, the departmental libraries and the supervisors' own collections are also available to students.
Here too, the importance of the EISZ, established and operated at the national level, should be highlighted, which provides broad and up-to-date access to various specialized literature databases. Every student has full access to the university Information Center. By using various applications and other sources, we have achieved that every doctoral student has a personal computer for their own use at their research site. The training and research activities of the doctoral schools of the University of Szeged are comprehensively supported by the services of the Klebelsberg Library. The library serves as the central scientific information center of SZTE and provides access to the most important international scientific databases (Scopus, Web of Science, ScienceDirect, SpringerLink, Wiley Online Library), as well as to several hundred scientific field Q1 and Q2 category journals.
The library's collection is built to fit the scientific field of each doctoral school and is regularly expanded based on suggestions from faculty librarians and departments. Access is also provided to students from home via online interfaces (VPN, eduID).
The library provides the following services specifically for doctoral students:

- individual and group information search consultation,
- bibliographic advice and training in citation management software (e.g. Zotero, EndNote),
- scientometrics briefing (impact factor, h-index, SJR),
- support for developing a publication strategy (Open Access options, avoiding predatory journals),
- Introduction to plagiarism control systems (e.g. Turnitin).
- AI-based systems that help prepare manuscripts and publications (e.g. Writefull, Scite)

The management of SZTE pays special attention to the continuous development of library services. As part of the quality assurance system, needs are assessed and feedback is provided annually. Development proposals are evaluated jointly by the library and the SZTE Institute for Educational Development.
Section 3 (1) of the Doctoral Regulations highlights that:
"A prerequisite for doctoral training is the provision of up-to-date library facilities tailored to the scientific field of training and an access system supporting scientific research."
The quality and quantity of the research infrastructure can be measured by the fact that the University of Szeged receives more than 10% of the higher education portion of various basic and applied research grants, making us one of the top three Hungarian universities in all respects. It is known that one of the criteria for assessing these applications (in addition to the originality of the idea and the suitability of the researchers) is the existence of the research infrastructure. Detailed information about these can be obtained from the websites of the departments participating in the doctoral training. Without claiming to be exhaustive, we present some of the major instruments and devices available to students: X-ray diffraction equipment, equipment suitable for measuring small-angle X-ray scattering (nanosciences!), static and dynamic light scattering measurements, thermal analysis (DTG, DTA, DSC), specific surface area measurements, atomic force microscope, electron microscopes (TEM, SEM), total organic carbon (TOC/TOX) measurements, ultraviolet, visible and infrared spectrometers, sometimes built-in for in situ measurements, fluorescent spectrophotometer, analytical equipment based on various separations (GC, HPC, EC) in combination with a mass spectrometer (GC-MS, HPLC-MS, EC-MS), chemical photochemical reactors, tunable laser sources, cascade lasers, photoacoustic detectors, amplifiers, spectrum analyzers, equipment park for biological and earth science field investigations, off-road vehicles, research station at the Kiskunság National Park. Equipment available to doctoral students in the

environmental engineering program: VSEP (Vibratory Shear-Enhanced Processing) vibration membrane filtration equipment (New Logic Research, Inc.), MEUF (Micellar Enhanced Ultrafiltration (micelle-assisted ultrafiltration and microfiltration equipment (Millipore), PCI (Paterson Candy International) tubular membrane filtration equipment with MF/UF/NF/RO modules, Goniometer for measuring the surface contact angle of membranes (OCA 15Pro, Dataphysics), TOC (Total Organic Carbon) Teledyne, Tekmar) total organic carbon and total nitrogen (TN) determination equipment, MINIFORS laboratory fermentation system, test reactor throats, RohdeSchwarz ZVL3-DAK3.5 dielectric measurement system, continuous material transfer microwave treatment and measurement system, for microwave pretreatment of materials of different viscosities (industrial wastewater, industrial oil emulsions, etc.).

I.3.4 The support available to doctoral students in the event of academic, scientific/artistic issues and social difficulties is tailored to needs and ensures inclusivity and equal opportunities.

(To what extent are they able to handle non-class credit values during academic administration? In the case of foreign language training, to what extent are the administrative staff able to provide foreign-language doctoral students with the same level of services as Hungarian-speaking ones? What kind of mentoring, catch-up, talent management and career counseling assistance do they provide? How and with what efficiency do they promote access to education for people with disabilities and other disadvantaged groups?)

The doctoral studies involve a number of "non-classroom" courses, which are essentially individual work, under the continuous guidance of the supervisor. The crediting of these courses can be viewed in the curriculum.
For English-speaking doctoral students, the Dean's Office of the Faculty of Humanities and Social Sciences deals with them in a special way (international referent) and provides them with a special reception class both during the enrollment period and during their studies. Mentoring is individually tailored, with special attention to research competencies, and is primarily carried out by the supervisor, but students can also use the support of a student assistant appointed by the Directorate of External Relations in the first year, primarily in solving integration, social and health problems.

I.3.5 All relevant information related to the doctoral school (regulations, procedures, decisions, defense and other information, topic announcements, theses of those who have obtained their degrees) is public, up-to-date, and easily found (at least from the institution's website and the ODT database).

(What procedures ensure the publication of the latest information? In the case of uniform institutional procedures, what subsystem does the doctoral school form within them, and how does it participate in the development and further development of the procedures? Is the information available in a foreign language? Is there a website where all relevant information can be found for those interested? What other communication channels are used for scientific or other purposes (e.g. publications, project days, conferences, social media, newsletter, etc.)?)

Documents containing essential information are available on the doktori.hu website, the website of the Doctoral Institute of SZTE (https://u-szeged.hu/dokint), as well as on the website of the SZTE TTIK (https://sci.u-szeged.hu/kutatas/doktori-iskolak/kornyezettudomanyi-doktori-iskola), and on the SZTE Coospace interface, to which active PhD students and lecturers are assigned. The university doctoral regulations and the special rules specific to our doctoral school are displayed under the appropriate menu items on the website of the Doctoral Institute of SZTE. On the TTIK website, the head of the KTDI is responsible for the authenticity of the information regarding KTDI, and the head and administrator of the DI are responsible for the up-to-dateness of the news. The Coospace interface is also an opportunity for a two-way, fast exchange of information between several students and the supervisor/instructor, or for KTDI students to communicate with each other on a daily basis and to be immediately informed about news concerning KTDI.
Symposium on tin Analytical and Environmental Problems - https://www2.sci.u-szeged.hu/isaep/), an event in which KTDI students participate in a significant number, therefore this event also plays a very valuable informational and communication role in addition to its scientific value.

I.3.6 Doctoral students are involved in educational activities at the institution.

(In domestic and international comparison, how did the educational workload of doctoral students develop during the period covered by the self-evaluation report? What feedback has been received from doctoral students or other stakeholders in this regard, and how have you taken this into account/do you plan to take it into account?)

The educational activities of doctoral students are evaluated with credits (depending on the number of teaching hours). The crediting of educational activities can be viewed in the training plan. PhD students are primarily involved in the implementation of seminars and laboratory exercises, as well as field exercises. They also actively participate in assisting the experimental work of diploma and specialist theses. A maximum of 48 credits can be obtained through education, but a maximum of 8 in a semester. Statistics on the educational activities of doctoral students over the past five years:

	Number of PhD students completing the course in the given semester (year/person)			
	1 hour per week (2 credits)	2 hours per week (4 credits)	3 hours per week (6 credits)	4 hours per week (8 credits)
2020/2021	2	3	5	13
2021/2022	2	10	0	9
2022/2023	1	7	6	8
2023/2024	1	14	5	6
2024/2025	1	10	4	4

I.4 Learning, teaching and research activities

Demonstrate the fulfillment of the following criteria:

I.4.1 The admission procedure and admission requirements are clearly stated.

(When and where can I find out about the admission requirements? How does the credit transfer and credit recognition system work? How is it ensured that the rules and procedures for individual candidates align with the general rules?)

The admission requirements are set out in the training plan, which is available on doktori.hu (https://doktori.hu/index.php?menuid=191&lang=HU&di_ID=152) and the SZTE TTIK website (https://sci.u-szeged.hu/english/phd-programs/doctoral-school-of-environmental).
The application for the training is done through the university Modulo system. We also inform interested parties about the possibility of applying through Modulo through the University website (https://www.u-szeged.hu/dokint/felveteli/jelentkezes), paying special attention to those preparing individually. You can apply for the research topics announced by the doctoral schools every year at the following times: ***until May 15*** , in the case of a supplementary admission procedure ***until August 20*** , in the case of a cross-semester ***until December 31.*** Electronic application can begin via Modulo one month before the deadline. Applicants will be notified of the date of the oral admission by e-mail two weeks before the deadline. The oral admission usually takes place in the last week of June, after the final exams.

The rules for individual candidates are as follows, in accordance with the Doctoral Regulations of the University of Szeged: individual candidates begin their studies with a complex exam, which, if successful, will award them 120 credits. They can obtain the additional 120 credits required for the degree partly by crediting their previously completed scientific results and performance (in accordance with the DI training plan) . The DI council decides on the credit recognition. During the training (similarly to non-individual candidates), they can obtain the 240 credits required for the absolutorium through additional non-educational courses.

I.4.2 The professional content and structure of the training, the applied teaching and learning support methods are modern, meet professional and scientific/artistic expectations, and are suitable for achieving the set learning outcomes. The intensity of contact between supervisors and doctoral students is appropriate. The training process is suitable for doctoral students to master the application of scientific/artistic methods, achieve and demonstrate an evaluable scientific/artistic result.

(How do you take into account the diversity of doctoral students' needs? How do you support the development of flexible, individual training paths? How do you handle doctoral students' complaints? How do you ensure the appropriate level of intensity of the supervisor's activity and its (financial) encouragement? How do you develop the educational methodological preparedness of instructors? How do you help mutual respect prevail in the student-instructor relationship? How do you exploit the opportunities offered by digital technology?)

Due to the nature of the doctoral program, students enroll in courses after consulting with their supervisor. We currently have nearly 120 live educational (classroom-type) courses, the topics of which cover the majority of the programs operated by KTDI and the announced research topics. The course list is constantly updated according to demand. Given that the number of students applying for a course does not exceed a few in a given semester, it is possible to adapt the course material to the interests and research topics of the student enrolling. The training plan clearly reflects that a significant part of the courses completed during the training are individual courses, the completion of which requires regular consultation and close cooperation with the supervisor (e.g. preparing a publication, preparing for a conference presentation). The only mandatory course that students take each semester is the Specialized Laboratory/labwork, which is 20 hours per week, research work carried out in consultation with the supervisor, a significant part of which in many cases is laboratory work or field practice. This, by its nature, requires and results in an intensive student-teacher relationship.

The University of Szeged has been implementing the O3 (Open Online Education) strategy for years. SZTE provides all its lecturers with training opportunities to develop their teaching methodology (https://u-szeged.hu/ikikk/digitalizacios/oktatasmodszertani-fp), mostly within the framework of one-day training sessions based on personal presence, or through completing Coursera courses. SZTE also conducts several educational development projects aimed at ensuring quality education and developing students' competencies. These include the Educational Methodology Development Project, which aims to develop the methodology of lecturers and offers SZTE lecturers free, certificate-ending training courses aimed at mastering modern teaching methods and raising the standard of education.
The Coospace interface not only serves to maintain contact between the instructor and the student, but also allows for the creation of test series and online exams that facilitate and verify the acquisition of the curriculum, as well as the sharing of documents (e.g. lecture materials) necessary for completing the given course.

I.4.3 The doctoral school includes the participation of doctoral students in international conferences, partial training, and mobility in their academic obligations. During doctoral training, the opportunity to participate in foreign language courses and the presence of international lecturers and students are ensured.

(How is the recognition of scientific/artistic learning/research outside of doctoral school ensured? Annex 3.1-3: Foreign partial training and scholarships; Foreign language courses; Guest lecturers.)

The training plan includes the inclusion of participation in domestic and international conferences, summer schools, and foreign professional internships, short and long-term study trips, and Coursera courses in doctoral studies, and their credit values. Within the framework of KTDI, all courses are available in Hungarian and English. Doctoral courses held in English for foreign students are also open and can be enrolled for Hungarian-speaking students. The lectures of foreign lecturers and researchers take place primarily within the framework of departmental seminars, they are not organized by DI. At the same time, the DI training plan gives students the opportunity to join courses of other Doctoral Schools, for which credits can be obtained as described in the training plan. The majority of international students enter DI within the framework of the Stipendium Hungaricum application as PhD students, a smaller proportion of them apply for cost-reimbursed training through professional connections. The following table contains data on the international mobility of KTDI students for the past 5 years:

Program name (e.g. Erasmus, Fulbright)	Name and city of the host institution	Time spent at the host institution	Recognized credit/doctoral student
ERASMUS	High learning technical in Brno	43 days	not credited / Janovszky Patrick
ERASMUS	AGH University of Science and Technology, Kraków	108 days	20kr/Tamás Bozóki
ERASMUS	University Gdańsk	129 days	26kr/Hungarian Botond
ERASMUS	University to go Florence Studies	180 days	20kr/Napsugár Krisztina Nagy
Pannonia	University to go Studies of Perugia	5 days	5kr/Frei Kata
Pannonia	Society for Conservation Biology and Society for Conservation Biology Oceania	6 days	5kr/Gábor Li
EUGLOH	Ludwig- Maximilian - Universität München	7 days	not credited /Hadid Sukmana
EUGLOH	University of Porto	7 days	not credited /Hadid Sukmana
EUGLOH	EUGLOH	5 days	not credited /Hadid Sukmana
EUGLOH	Lund University	4 days	not credited / Abdelouahed Fannakh
EUGLOH	University of Tromsø	7 days	not credited / Indri Puspitasarı

I.4.4 The rules and procedures of the doctoral school regarding examination and assessment are suitable for assessing the achievement of learning outcomes. The method of assessing doctoral student performance and conducting complex examinations is professionally appropriate, transparent, and the impartiality of the assessment is ensured.

(How is the prior publicity and consistent application of the evaluation criteria system ensured? How are the members of the evaluation committee selected? Are there any additional internal rules in addition to the legal requirements? Has there been a case in the last five years where members of the doctoral council seriously objected to the quality of a dissertation? Is language proofreading expected for dissertations in a foreign language? What feedback did the doctoral school receive from doctoral students regarding the evaluation during the period covered by the self-evaluation, and what changes have been made/are planned to be made based on this? How has the alignment of the rules and procedures for individual candidates with the general rules been ensured? What formal appeal options exist for doctoral students?)

All courses announced by DI end with a three- or five-grade assessment. When composing the committee for complex examinations (in addition to those stipulated in the Doctoral Regulations), we basically keep two aspects in mind: the members of the committee should carry out scientific work in the same or related field as the doctoral student's research topic, and they should not have joint publications with the doctoral student and his/her supervisor. This ensures professional competence and impartiality. The composition of the committee is approved by the EDT. An important part of the assessment of the complex examination is the supervisor's opinion, which must include an assessment of the doctoral student's personal attitude, motivation and professional development. The committee also takes into account the supervisor's written opinion when assessing the complex examination.
In the case of theses submitted for pre-defense, if the person invited for pre-evaluation does not find the thesis to be of adequate quality, he/she shall notify the supervisor and the head of the Department of Dissertation, who may, after reviewing the case and in consultation with the supervisor, recommend rewriting the thesis and restarting the pre-defense, or requesting a new reviewer (or both). (The rules regarding the pre-defense are included in the training plan).
In the case of theses in a foreign language, language proofreading is not required, but the appropriate language standard is expected, and this is checked by the persons conducting the pre-evaluation.

I.4.5 The doctoral school promotes the orientation of doctoral students as higher education teachers/researchers, their employability and their active civic engagement.

(How are doctoral students prepared for grant programs, research project management, creativity and innovation methodologies, and the management of intellectual property issues in research? How are the development of autonomous research and expert perspectives and skills, and cooperation with industrial and/or research institute partners, encouraged? What kind of educational, attitude-shaping, local economic development, social challenge-solving, and other 3rd mission programs are doctoral students involved in?)

The lecturers (full members, supervisors) participating in the program have been very active in scientific applications, and the number of applications they have won that can be linked to doctoral training to some extent exceeds two hundred, and the amount of support received in these applications is over 5 billion forints. Doctoral students also participate in these applications, in their entire vertical, i.e. from writing the application through implementation to writing the reports and the final report. By participating in the communications/ dissemination activities related to the applications, we develop their insight into the 3rd mission, their skills aimed at helping economic development and addressing social challenges. Of these, the mobility applications, which do not represent a large amount of support, but are of decisive importance for the students and significantly increase the international recognition and rank of the Doctoral School, should be highlighted.

I.4.6 During doctoral training, there is an opportunity for contact and cooperation (e.g. joint publication) between doctoral students and lecturers/researchers/artists operating within and outside the given institution.

(In what organized and unorganized ways does the doctoral school support the aforementioned cooperation and contacts (e.g. membership in international professional associations)? Attach the cooperation agreements concluded by the higher education institution related to the activities of the doctoral school [1], including cooperation contracts concluded with the research institute of core members employed at external research institutions [2], and evaluate the practical implementation of the cooperation. What kind of international network does the doctoral school have, and in what form and with what results can doctoral students utilize this?)

In the previous point, we have already mentioned the relations with the competitive sector, the importance of which cannot be emphasized enough. The most significant forum for the development of regional relations is the Szeged Academic Committee of the Hungarian Academy of Sciences (MTA SZAB). Our lecturers and students regularly participate in the work of the competent committees of the SZAB, our students participate in scientific competitions and professional events and lectures announced by the SZAB. At the initiative of the head of the Doctoral School of Environmental Sciences, we announce so-called "golden courses", to which we invite a prestigious international or domestic representative of environmental science and environmental protection, who gives lectures on one of the sub-areas of their research. These lectures end with professional discussions and almost always informal conversations. As a result, several of our students have already received invitations for shorter or longer study trips.
Several lecturers at KTDI are members of the Environmental Chemistry Committee of the Hungarian Academy of Sciences and several working committees of the Hungarian Academy of Sciences. PhD students often participate in these working committee meetings and are given the opportunity to introduce themselves, thus creating the opportunity for leading researchers from domestic research institutions working in similar fields to get to know our students, their work, and help establish cooperation.
We maintain close contact with those domestic higher education institutions where environmental science and environmental protection education is conducted. One of the content and form elements of this is the meetings and consultations organized annually. Within this framework, of course, doctoral training is also on the agenda. In addition, we frequently receive invitations from other doctoral schools in the country, in which we are invited to participate in the doctoral activities (complex examination, preliminary defense, defense) taking place there. With this, we can gain insight into the educational and research strategies of doctoral schools operating in other scientific fields.
The current scope does not allow for a list of the international connections of KTDI lecturers, these can be viewed in detail on the websites of the individual lecturers. The direct benefit of these connections is that, through various mobility and other applications, almost all of our doctoral students get to go abroad for a longer or shorter study trip at least once.

I.5 Academic and labor market performance of doctoral students

Demonstrate the fulfillment of the following criteria:

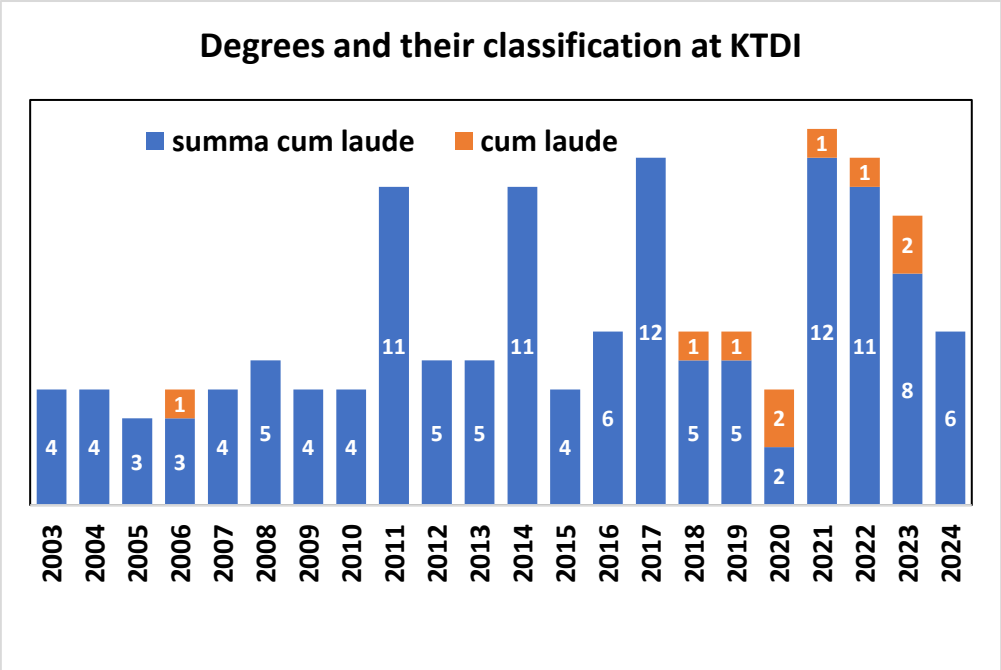
I.5.1 The degree-granting rate of enrolled doctoral students reaches the level specified in the quality objectives of the doctoral school.

(How does the doctoral school assess the degree-earning rate of doctoral students, what steps does it take to increase it if it deems it necessary? What are the main reasons for dropout and/or delayed degree-earning? Annex 4: Degree-earning statistics)

Since the launch of the Doctoral School of Environmental Sciences, 173 students have started their studies in the organized training, of whom 99 students have obtained an absolutorium; a total of 94 have obtained degrees in the Doctoral School (The presentation of the dissertations defended in the period 2014-2018 can be found in Appendix 1). Three years of studies are only exceptionally sufficient to prepare a dissertation and obtain a degree, on average five years are required.

[1] *Government Decree No. 387/2012. (XII. 19.) Section 5 (3)*

[2] *Government Decree No. 387/2012. (XII. 19.) Section 2 (5)*



Annual distribution of KTDI graduates (total degrees awarded in the given year – EDT decision)

I.5.2 Doctoral students actively participate in domestic and international scientific/artistic collaborations, activities and events.

(Provide information and assessment of doctoral students' participation in scientific/artistic, professional, etc. events and conferences during the period covered by the self-evaluation, as well as the transfer of knowledge and experience gained from these.)

	Number of PhD students completing the course in the given semester				
	All	Participation in domestic conference (poster)	Participation in domestic conferences (lecture)	International conference participation (poster)	International conference participation (lecture)
2020/2021	59	1	9	31	18
2021/2022	53	3	8	25	17
2022/2023	57	2	11	21	23
2023/2024	109	2	11	48	28
2024/2025	45	5	6	22	12

The data in the table shows that students participate intensively in scientific forums (all participation is credited, which is recorded in the training plan). We consider it important to participate not only in international but also in domestic conferences. One of the reasons for the dominance of participation in international conferences is the proportion of foreign students in the student population. Students not only incorporate the knowledge they have acquired into their scientific work, but also use the events to expand their scientific contacts. The direct transfer of professional experience gained at events is primarily limited to a narrower professional circle (the work of PhD students is mostly tied to a research group).

I.5.3 The dissertations and publication/artistic activities of doctoral students reach the level specified in the quality objectives of the doctoral school.

(Overall, how does the doctoral school evaluate the activities of doctoral students, and based on what information, what is it doing to improve the quality?)

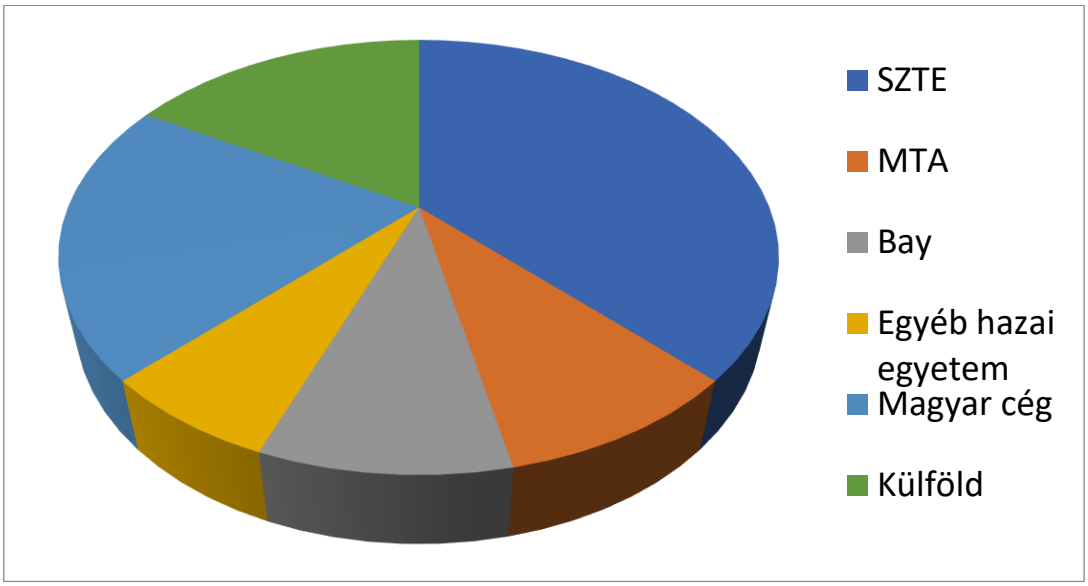
The school's academic performance can be characterized by the following numbers over the past 5 years (as of 2020):

Number of publications in scientific journals:	369
these are the cumulative impact factor (where relevant)	583,089
Number of full-length papers published in conference proceedings:	> 200
Number of presentations given at international conferences:	> 150
Number of presentations given at domestic conferences:	> 200

I.5.4 The further professional career of doctoral students reaches the level expected by the doctoral school.

(How does the doctoral school track the further life path of doctoral students and how does it use this information to develop its activities? Describe the life path of graduates based on career tracking data or typical examples.)

The KTDI Council is trying to track the lives of students who have earned their degrees through a network established through personal contacts. The information received from the sent-out data sheets contained substantive information on approximately 40% of the doctoral graduates.
Since the accreditation of the Doctoral School of Environmental Sciences, 15 of the 94 young professionals who have earned degrees have become lecturers and researchers at the University of Szeged. 6 works in other higher education institutions. 11 have taken up postdoctoral and research positions in domestic research institutes funded by the Hungarian Academy of Sciences, and 8 work at the Bay Zoltán Applied Research Public Nonprofit Kft. Many of our former students with degrees work abroad. Several work in public administration (Lower Tisza Rural Environmental, Nature Conservation and Water Inspectorate), and even more in the private sector.



Distribution of first jobs of KTDI graduates (following approximately 70% of students)

II. Attachments

Annex II.1: List of core members of the doctoral school certified by the rector

Announcement

I certify that the persons listed below are core members* of the **Doctoral School of Environmental Sciences of the University of Szeged,** who meet the conditions set out in Section 2, Subsections (3)-(5) and Section 3 of Government Decree 387/2012. (XII. 19.) on doctoral schools, the order of doctoral procedures and habilitation.

Doctoral School of Environmental Sciences

Name	Science*	Job**	Beginning of tribe membership	Expected end of tribe membership ***	Number of students who have earned degrees under his/her thesis supervision
Zoltán Konya	Chemistry	Professor	2001	2041	19
Pál Sipos	Chemistry	Professor	2014	2030	12.5
Zoltán Bozóki	Physics	Professor	2001	2035	8
Elemér Pál-Molnár	Earth science	Professor	2019	2034	5
Diana Banati	Engineering	Professor	2022	2032	2
Zoltán Bátori	Biology/ecology	Associate Professor	2024	2047	1.5
Cecilia Hodur	Engineering	Professor	2001	2027	7
Zsuzsanna Laszlo	Engineering	Professor	2024	2043	3.5

* In the case of a newly established doctoral school: prospective
** In the case of a doctoral school operating in multiple disciplines
*** Please select one of the following job titles:

- University professor
- University lecturer/researcher
- Professor emeritus/ emerita
- Scientific advisor or research professor employed at a research institute

**** In the case of an indefinite contract, the date until which the person concerned can hold the current job position, e.g. in the case of a university professor, the age of 70. In the case of a fixed-term contract, the end of the employment relationship according to the contract.

Date: Szeged, September 1, 2025.

……
Prof. Dr. Laszlo Rovó
Rector

Annex II.3.1: Foreign partial training and scholarships

Please list the details of doctoral students who have participated in partial training abroad or received research scholarships in the last five academic years (not necessary for newly launched doctoral schools):

Name of the DI	Program name (e.g. Erasmus, Fulbright)	Name and city of the host institution	Time spent at the host institution	Recognized credit/doctoral student
Bachelor of Science in Environmental Science	ERASMUS	High learning technical in Brno	43 days	not credited / Janovszky Patrick
Bachelor of Science in Environmental Science	ERASMUS	AGH University of Science and Technology, Kraków	108 days	20kr / Tamás Bozóki
Bachelor of Science in Environmental Science	ERASMUS	University Gdańsk	129 days	26kr / Hungarian Botond
Bachelor of Science in Environmental Science	ERASMUS	University to go Florence Studies	180 days	20kr / Krisztina Nagy Sunbeam
Bachelor of Science in Environmental Science	Pannonia	University to go Studies of Perugia	5 days	5kr / Kata Frei
Bachelor of Science in Environmental Science	Pannonia	Society for Conservation Biology and Society for Conservation Biology Oceania	6 days	5kr / Gabor Li
Bachelor of Science in Environmental Science	EUGLOH/ Social Entrepreneurship 4 Health	Ludwig- Maximilian - Universität München	7 days	uncredited / Hadid Sukmana
Bachelor of Science in Environmental Science	EUGLOH/A3C - Ageing, Climate Change and Citizenship (3rd Edition)	University of Porto	7 days	uncredited / Hadid Sukmana
Bachelor of Science in Environmental Science	EUGLOH/WP3.6 EUGLOH Tromsø Idea Camp 2024	University of Tromsø	5 days	uncredited / Hadid Sukmana
Bachelor of Science in Environmental Science	EUGLOH/Arts, Creative Health and Well-being_EUG2_T2_1_0001_C1	Lund University	4 days	not credited / Abdelouahed Fannakh
Bachelor of Science in Environmental Science	EUGLOH/BED-8004 Academic Entrepreneurship - Preparing PhD Students for an Entrepreneurial Career	University of Tromsø	7 days	not credited / Indri Puspitasarı

Annex II.4: Statistical presentation of degree acquisition

Please provide the following statistical data for the last 14 academic years (not required for newly launched doctoral schools).
Please enter numbers in fields BE and percentages in field F. Each row should contain data for the given academic year: for example, the first row of column E should contain the number of students enrolled in the 2005/06 academic year who have obtained a degree by the time the self-evaluation report is prepared [regardless of which year].
There may be several reasons why you cannot enter data in a field, for example, because the doctoral school did not yet exist that year, or there were no students studying in the new 2016 system. In such cases, leave the field blank.

A. School year	**B.** Number of first-year doctoral students starting their studies this academic year	**C.** Among doctoral students starting their studies this academic year: number of those who have taken a complex exam but have not yet obtained their absolutorium	**D.** Among doctoral students starting their studies this academic year: number of those who have graduated but have not yet obtained a degree	**E.** Number of doctoral students who started their studies this academic year who obtained a degree	**F.** Proportion of doctoral students who started their studies this academic year who did not obtain a degree (%) (=(BE)/Bx100)
2009/10	25	-	10	12	52%
2010/11	14	-	3	12	14%
2011/12	13	-	4	3	77%
2012/13	8	-	0	8	0%
2013/14	13	-	4	7	46%
2014/15	10	-	3	5	50%
2015/16	9	-	5	3	67%
2016/17	16	1	1	14	13%
2017/18	16	1	2	13	19%
2018/19	13	1	1	10	23%
2019/20	8	1	2	3	63%
2020/21	13	0	0	9	31%
2021/2022	8	3	5 people – did not have to earn a degree yet	they haven't finished yet	-
2022/2023	9	7	they haven't graduated yet	they haven't finished yet	-
2023/2024	11	3	they haven't graduated yet	they haven't finished yet	-