

The External Evaluation Report of a Doctoral Study Domain

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I. Introduction¹

The present report was created on the basis of the periodic evaluation visit of the Doctoral field - Environmental Engineering, at the Polytechnic University of Bucharest.

According to the agenda, the evaluation visit took place between 15-25 June 2021, being included in the institutional evaluation visit of IOSUD.

The evaluation commission appointed by ARACIS had the following composition:

- Professor Micle Valer - Technical University Cluj-Napoca;
- Professor Alberto Coz Fernandez - University of Cantabria - Spain;
- Ramona Ciobanu, PhD student in the field of Environmental Engineering at the Technical University "Gheorghe Asachi" of Iasi

The specific activities of the evaluation visit of the doctoral field were scheduled between 15-17 June - online meetings with the members of the evaluation commission and meetings with the evaluation commission and the representatives of the university, faculty, doctoral school management, doctoral field coordinator, doctoral students, graduated doctoral students in the field, employers etc. On June 21, the coordinator of the evaluation team, paid a visit to the Polytechnic University of Bucharest. During the visit, he had "face to face" meetings with all of the members and personnel.

II. Methods used

Within the Doctoral Field of Environmental Engineering from IOSUD-UPB, there are doctoral supervisors and doctoral students from the doctoral schools in Biotechnical Systems Engineering (ISB).

¹ Each time when applicable the information shall be presented gender-wise.



The Doctoral School of Biotechnical Systems Engineering (SD ISB) as part of the Faculty of Biotechnical Systems Engineering of the POLITEHNICA University of Bucharest * UPB *, carried out its activity in accordance with the regulations in force regarding doctoral studies at UPB, respectively, with the actions undertaken by The Council of Doctoral Studies at UPB * CSUD UPB *, as well as with the decisions of the UPB Senate.

The Doctoral School of Biotechnical Systems Engineering was established on 23.04.2012, within IOSUD-UPB, by including doctoral supervisors in the field of Engineering Sciences / Mechanical Engineering, tenured or with PhD students in internship and doctoral students under their coordination, who at on that date they were enrolled in the Polytechnic University of Bucharest. In 2018, it was introduced in the ISB doctoral school, the field of doctoral studies environmental engineering having five doctoral supervisors. In 2019, another two PhD supervisors were affiliated to SD-ISB. Of the seven PhD supervisors working in the field of environmental engineering, within the ISB faculty, six are full-time PhD supervisors at UPB, and one of the PhD supervisors is a first degree scientific researcher at the National Research-Development Institute for Environmental Protection.

The meetings of the Evaluation Commission are summarise in the following table:

| Meeting | People involved and topic |
|-------------------------|--|
| 1 st meeting | Members of the Aracis evaluation panel Topic: Evaluation activities - ARACIS Periodical External Evaluation, Environmental Engineering Doctoral School |
| 2 nd meeting | Members of the Aracis evaluation panel PhD student coordinators Topic: Meeting Academic Staff - ARACIS Periodical External Evaluation, Environmental Engineering Doctoral School |
| 3 rd meeting | Members of the Aracis evaluation panel PhD students Topic: Meeting PhD students - ARACIS Periodical External Evaluation, Environmental Engineering Doctoral School |
| 4 th meeting | Members of the Aracis evaluation panel Employers Topic: Meeting with employers - ARACIS Periodical External Evaluation, Environmental Engineering Doctoral School |
| 5 th meeting | Members of the Aracis evaluation panel CSD ISB members |



| | |
|-------------------------|--|
| | Topic: CSD Meeting - ARACIS Periodical External Evaluation, Environmental Engineering Doctoral School |
| 6 th meeting | Members of the Aracis evaluation panel, Directors/persons in charge of the research centers/laboratories Topic: Meeting with Directors/persons in charge of the research centers/laboratories - ARACIS Periodical External Evaluation, Environmental Engineering Doctoral School |
| 7 th meeting | Conclusions |

Apart from that, the visit took place on the 20 April 2021.

III. Analysis of ARACIS's performance indicators

Domain A. INSTITUTIONAL CAPACITY

**general description of domain analysis.*

Criterion A.1. The administrative, managerial institutional structures and the financial resources

**general description of the criterion analysis.*

Standard A.1.1. The institution organizing doctoral studies (IOSUD) has implemented the effective functioning mechanisms provided for in the specific legislation on the organization of doctoral studies.

**general description of the standard analysis.*

Performance Indicator A.1.1.1. *The existence of specific regulations and their application at the level of the Doctoral School of the respective university doctoral study domain:*

- (a) the internal regulations of the Doctoral School;*
- (b) the Methodology for conducting elections for the position of director of the Council of doctoral school (CSD), as well as elections by the students of their representative in CSD and the evidence of their conduct;*
- (c) the Methodologies for organizing and conducting doctoral studies (for the admission of doctoral students, for the completion of doctoral studies);*
- (d) the existence of mechanisms for recognizing the status of a Doctoral advisor and the equivalence of the doctoral degree obtained abroad;*
- (e) functional management structures (Council of the doctoral school), giving as well proof of the regularity of meetings;*
- (f) the contract for doctoral studies;*
- (g) internal procedures for the analysis and approval of proposals regarding the training for doctoral study programs based on advanced academic studies.*



- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself
- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. There are enough regulations and mechanisms in the doctoral school for carrying out the environmental engineering domain.

Recommendations:

- 1. Specific regulations to take into account not only scientific papers for the final thesis but also patents with industry in order to reinforce the research, development and innovation with the industry.**

Performance Indicator A.1.1.2. *The doctoral school' Regulation includes mandatory criteria, procedures and standards binding on the aspects specified in Article 17, paragraph (5) of the Government Decision No. 681/2011 on the approval of the Code of Doctoral Studies with subsequent amendments and additions.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself
- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled.

I do not have any recommendation

Standard A.1.2. The IOSUD has the logistical resources necessary to carry out the doctoral studies' mission.

**general description of the standard analysis.*

Performance Indicator A.1.2.1. *The existence and effectiveness of an appropriate IT system to keep track of doctoral students and their academic background.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself
- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. There is an IT system for all of the academic part of the PhD students. The system is in Romanian language

Recommendations:

- 1. To include English language in the IT system, at least for international students.**



Performance Indicator A.1.2.2. *The existence and use of an appropriate software program and evidence of its use to verify the percentage of similarity in all doctoral theses.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. There is a software to verify all thesis and details. The software is in Romanian language

Recommendations:

- 1. To include English language in the software.**

Standard A.1.3. The IOSUD makes sure that financial resources are used optimally, and the revenues obtained from doctoral studies are supplemented through additional funding besides governmental funding.

**general description of the standard analysis.*

Performance Indicator A.1.3.1. *Existence of at least one research or institutional / human resources development grant under implementation at the time of submission of the internal evaluation file, per doctoral study domain under evaluation, or existence of at least 2 research or institutional development / human resources grant for the doctoral study domain, obtained by doctoral thesis advisors operating in the evaluated domain within the past 5 years. The grants address relevant themes for the respective domain and, as a rule, are engaging doctoral students.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. Some of the PhD students of the environmental engineering domain have more funding from national and international projects, increasing the possibilities to have a good quality of live in Bucharest with the total budget.

Recommendations:

- 1. Try to increase the institutional budget of all PhD students in order to avoid the use of other funding to complete the salary of the PhD student. In this way, the budget of other projects can be used to be able to hire technicians and other types of contracts that greatly help in the research work of the faculties included in the environmental engineering domain.**
- 2. Try to have enough salary for all PhD students in the program.**
- 3. In addition, the institution can increase the budget for funding small research groups in order to promote these kinds of groups.**



Performance Indicator *A.1.3.2. *The percentage of doctoral students active at the time of the evaluation, who for at least six months receive additional funding sources besides government funding, through scholarships awarded by individual persons or by legal entities, or who are financially supported through research or institutional / human resources development grants is not less than 20%.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself*

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself*

The indicator is partially fulfilled. Some PhD students in the environmental engineering domain receive additional funding sources from research projects.

Recommendations:

The recommendations in this indicator are related to the previous one (see Indicator A.1.3.1).

Performance Indicator *A.1.3.3.² *At least 10% of the total amount of doctoral grants obtained by the university through institutional contracts and of tuition fees collected from the doctoral students enrolled in the paid tuition system is used to reimburse professional training expenses of doctoral students (attending conferences, summer schools, training, programs abroad, publication of specialty papers or other specific forms of dissemination etc.).*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself*

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself*

The indicator is fulfilled in the environmental engineering PhD domain at a global point of view. However, some PhD students do not know about some of these initiatives and they lost the opportunity to use them.

Recommendations:

- 1. Increase the publicity of these kinds of initiatives in all PhD students and coordinators in different media.**
- 2. Increase the funding for open access publications**

Criterion A.2. Research infrastructure

**general description of the criterion analysis.*

Standard A.2.1. The IOSUD has a modern research infrastructure to support the conduct of doctoral studies' specific activities.

**general description of the standard analysis.*

² The indicators marked with an asterisk (*) hold a special status, referring exclusively to the evaluation of doctoral studies domains, as per Article 12 from the annex No.1 of the Order of the minister of education No. 3651/12.04.2021 approving the Methodology for evaluating university doctoral studies and the system of criteria, standards and performance indicators used in the evaluation. In case they are not met, the Agency extends a period of maximum 3 years to IOSUD to correct the respective deficiencies.



Performance Indicator A.2.1.1. *The venues and the material equipment available to the doctoral school enable the research activities in the evaluated domain to be carried out, in line with the assumed mission and objectives (computers, specific software, equipment, laboratory equipment, library, access to international databases etc.). The research infrastructure and the provision of research services are presented to the public through a specific platform. The research infrastructure described above, which was purchased and developed within the past 5 years will be presented distinctly.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is totally fulfilled. The infrastructure of the environmental engineering PhD domain is more than enough for the research in all of the research areas.

Recommendations:

- 1. Try to increase the use of all of the infrastructure in order to do some external analysis apart from the research and teaching activities. This can be useful to increase the possibilities of collaboration with the industry in the main areas of the program.**
- 2. Try to increase the possibilities of collaboration with other faculties and programs for a better use of the infrastructure.**
- 3. Try to increase at institutional level, the funding for the maintenance of all of the infrastructure.**

Criterion A.3. Quality of Human Resources

**general description of the criterion analysis.*

Standard A.3.1. At the level of each domain there are sufficient qualified staff to ensure the conduct of doctoral study program.

**general description of the standard analysis.*

Performance Indicator A.3.1.1. *Minimum three doctoral thesis advisors within that doctoral domain, and at least 50% of them (but no less than three) meet the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates (CNATDCU) in force at the time when the evaluation is carried out, which standards are required and mandatory for obtaining the enabling certification.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. There are enough coordinators with the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates and the majority of them are teachers in the faculties related to the program.

Recommendations:

1. Try to use more different criteria apart from the scientific research related to patents and other knowledge transfer for the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates in order to reinforce the collaborations with different institutions in the research and to increase the innovation.
2. Try to increase the training of teachers in order to increase the advisors meeting the criteria.

Performance Indicator *A.3.1.2. *At least 50% of all doctoral advisors have a full-time employment contract for an indefinite period with the IOSUD.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. About 85 % of all doctoral coordinators have full-time employment contract at the University.

Recommendations:

1. Try to increase this indicator, increasing the quantity of teachers at the University with the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates.

Performance Indicator A.3.1.3. *The study subjects in the education program based on advanced higher education studies pertaining to the doctoral domain are taught by teaching staff or researchers who are doctoral thesis advisors / certified doctoral thesis advisors, professors / CS I or lecturer / CS II, with proved expertise in the field of the study subjects they teach, or other specialists in the field who meet the standards established by the institution in relation with the aforementioned teaching and research functions, as provided by the law.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is totally fulfilled. The coordinators of the doctoral theses have a high expertise in the topics of the environmental engineering program and also with a multidisciplinary point of view, covering novel and innovative areas, including organic and inorganic pollutants, catalysis, agriculture pollution and control, nanomaterials or environmental quality analysis.

Recommendations:

1. Try to increase the co-tutelage with specialists in industries related to the environmental engineering topics.
2. Try to increase the co-tutelage with more international researchers.



Performance Indicator *A.3.1.4. *The percentage of doctoral thesis advisors who concomitantly coordinate more than 8 doctoral students, but no more than 12, who are themselves studying in doctoral programs³ does not exceed 20%.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled; however, the ratio between PhD students and coordinators is close to 6.

Recommendations:

- 1. Try to increase the quantity of teachers with the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates.**
- 2. Try to increase the co-tutelage with specialists in industries or with more international researchers related to the environmental engineering topics (see Indicator A3.1.3).**
- 3. Try to establish regulations and funding for the reinforcement of small research groups in order to increase the number of doctoral theses and coordinators for this kind of groups.**

Standard A.3.2. The Doctoral advisors within the domain are carrying out a scientific activity visible at international level.

**general description of the standard analysis.*

Performance Indicator A.3.2.1. *At least 50% of the doctoral thesis advisors in the evaluated domain have at least 5 Web of Science- or ERIH-indexed publications in magazines of impact, or other achievements of relevant significance for that domain, including international-level contributions that indicate progress in scientific research - development - innovation for the evaluated domain. The aforementioned doctoral thesis advisors enjoy international awareness within the past five years, consisting of: membership on scientific boards of international publications and conferences; membership on boards of international professional associations; guests in conferences or expert groups working abroad, or membership on doctoral defense commissions at universities abroad or co-leading with universities abroad. For Arts and Sports and Physical Education Sciences, doctoral thesis advisors shall prove their international visibility within the past five years by their membership on the boards of professional associations, membership in organizing committees of arts events and international competitions, membership on juries or umpire teams in artistic events or international competitions.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

³ 3 years for the doctoral university studies with the duration stipulated at Article 159, paragraph (3), respectively 4 years for the doctoral university studies with the duration stipulated at Article 174, paragraph (3) of the Law of national education No.1/2011 with subsequent amendments and additions, with additional extension periods approved as per Article 39, paragraph (3) of the Code of doctoral studies approved by the GD No. 681/2011 with subsequent amendments and additions.

The indicator is totally fulfilled. In spite of having not a lot of advisors, the contributions of all of them are more than enough, with scientific publications, projects, international conferences and so on.

Recommendations:

1. Try to use more different criteria apart from the scientific research related to patents and other knowledge in order to reinforce the collaborations with different institutions in the research and to increase the innovation.
2. Try to increase the training programs related to writing papers and proposals for all teachers at the University in order to increase the quantity of teachers as supervisors of doctoral thesis.
3. Increase the funding and possibilities to publish in open access.

Performance Indicator *A.3.2.2. *At least 50% of the doctoral thesis advisors in a specific doctoral study domain continue to be active in their scientific field, and acquire at least 25% of the score requested by the minimal CNATDCU standards in force at the time of the evaluation, which are required and mandatory for acquiring their enabling certificate, based on their scientific results within the past five years.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. The advisors are continuously being active in research and innovation in the topics of the environmental engineering domain.

Recommendations:

1. Try to reinforce the collaboration with industry and to establish some grants in industries related to environmental engineering domains in order to reinstate PhDs in research, development and innovation departments within those industries.
2. Try to increase the possibilities of funding for Post doctoral research projects
3. Try to increase the courses and units at the University related to international projects in order to increase the training of the personnel at the University in the preparation of proposals.

Domain B. EDUCATIONAL EFFECTIVENESS

**general description of domain analysis.*

Criterion B.1. The number, quality and diversity of candidates enrolled for the admission contest

**general description of the criterion analysis.*

Standard B.1.1. *The institution organizing doctoral studies has the capacity to attract candidates from outside the higher education institution or a number of candidates exceeding the number of seats available.*

**general description of the standard analysis.*

Performance Indicator *B.1.1.1. *The ratio between the number of graduates of masters' programs of other higher education institutions, national or foreign, who have enrolled for the doctoral admission contest within the past five years and the number of seats funded by the state budget, put out through contest within the doctoral domain is at least 0.2 or the ratio between the number of candidates within the past five years and the number of seats funded by the state budget put out through contest within the doctoral studies domain is at least 1,2.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. There are so many PhD students in relation to master students in the field of environmental engineering.

Recommendations:

- 1. Try to increase the possibilities of collaboration with industries related to the field in order to increase the number of PhD students working in these fields and more related to the market than the basic research.**

Standard B.1.2 Candidates admitted to doctoral studies demonstrate academic, research and professional performance.

**general description of the standard analysis.*

Performance Indicator *B.1.2.1. *Admission to doctoral study programs is based on selection criteria including: previous academic, research and professional performance, their interest for scientific or arts/sports research, publications in the domain and a proposal for a research subject. Interviewing the candidate is compulsory, as part of the admission procedure.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. All PhD students have an admission procedure related to the previous experience, the grades, and an interview.

Recommendations:

- 1. Try to increase the possibilities of PhD students working in companies relate to the field of environmental engineering.**

Performance Indicator B.1.2.2. *The expelling rate, including renouncement / dropping out of doctoral students 3, respectively 4, years after admission⁴ does not exceed 30%.*

⁴ 3 years for the doctoral university studies with the duration stipulated at Article 159, paragraph (3), respectively 4 years for the doctoral university studies with the duration stipulated at Article 174, paragraph (3) of the Law of national education No. 1/2011 with subsequent amendments and additions.



- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. In addition, the PhD students have the possibility to do the PhD at a part-time and they also can interrupt the period of time, increasing the possibilities to fulfill this criteria.

Recommendations:

1. Try to increase the possibilities of accommodation and other issues in order to help the possibilities of the students to continue with the PhD.
2. Try to increase the social activities at the University for PhD students in order to create a good atmosphere in the institution.
3. Try to add a unit at the university for helping the PhD students at a psychological point of view. There is an increase of these kinds of problems during the PhD.

Criterion B.2. The content of doctoral programs

**general description of the criterion analysis.*

Standard B.2.1. The training program based on advanced university studies is appropriate to improve doctoral students' research skills and to strengthen ethical behavior in science.

**general description of the standard analysis.*

Performance Indicator B.2.1.1. *The training program based on advanced academic studies includes at least 3 disciplines relevant to the scientific research training of doctoral students; at least one of these disciplines is intended to study in-depth the research methodology and/or the statistical data processing.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is partially fulfilled. The PhD students have 5 mandatory courses during the PhD degree, 3 of them for all PhD students and 2 of them about the speciality; however, because of the different possibilities and futures of the PhD students, the courses should be increased, especially in subjects related to research, innovation, outreaching and enterperneuship.

Recommendations:

1. Try to increase the number of courses (they can be optional) in the PhD program, especially in subjects related to research, innovation, outreaching and enterperneuship.
2. Try to increase the practical part of the courses in the program. For example, the PhD students can prepare a project and a scientific paper at the end of some courses.

Performance Indicator B.2.1.2. *At least one discipline is dedicated to Ethics and Intellectual Property in scientific research or there are well-defined topics on these subjects within a discipline taught in the doctoral program.*



- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. The course about Ethics is very interesting and this is a highlight of the program.

Recommendations:

- 1. Try to increase the competences related to intellectual property, not only in the courses but also in the possibilities to finish the doctoral thesis.**

Performance Indicator B.2.1.3. *The IOSUD has mechanisms to ensure that the academic training program based on advanced university studies addresses „the learning outcomes”, specifying the knowledge, skills, responsibility and autonomy that doctoral students should acquire after completing each discipline or through the research activities⁵.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. The IOSUD has enough mechanisms. The academic training is not very complicated in this case, so it is easy to fulfil it.

Recommendations:

- 1. The recommendations in this case are more related to the increase of courses and all of them where explained in the *Indicator B.2.1.1*.**

Performance Indicator B.2.1.4. *All along the duration of the doctoral training, doctoral students in the domain receive counselling/guidance from functional guidance commissions, which is reflected in written guidance and feedback or regular meeting.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

⁵ Or by what the graduate should know, understand and to be able to do, according to the provisions of the Methodology of 17 March 2017 regarding inscription and registration of higher education qualifications in the National Register of Qualifications in Higher Education (RNCIS) approved by the Order No.3475/2017 with subsequent amendments and additions.

The indicator is fulfilled. The counselling/guidance of the PhD students are given by several mechanisms and collaborators, including the relationships with other PhD students from the program, the relationships with different institutions and departments, and also the representatives. In addition, the supervisors of each PhD students have a high experience in the guidance of the students. On the other hand, the students need to prepare 2 scientific reports per year and this facilitates the continuation of the training.

Recommendations:

1. Apart from the guidances related to the reseach and training activities, the PhD students can have more options of social activities with other PhD students in different programs at the University.
2. Other recommendations in this indicator are related to the previous ones.

Performance Indicator B.2.1.5. For a doctoral study domain, the ratio between the number of doctoral students and the number of teaching staff/researchers providing doctoral guidance must not exceed 3:1.

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. This program has a high ratio of PhD student per coordinator, however, there are more staff and researchers related to the the guidance of the students and the ratio is close to 1:1.

Recommendations:

1. Try to increase the quantity of teachers with the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates.
2. Try to increase the co-tutelage with specialists in industries or with more international researchers related to the environmental engineering topics (see Indicator A3.1.3).
3. Try to increase the number of coordinators from other institutions and from abroad.

Criterion B.3. The results of doctoral studies and procedures for their evaluation.

**general description of the criterion analysis.*

Standard B.3.1. Doctoral students capitalize on the research through presentations at scientific conferences, scientific publications, technological transfer, patents, products and service orders.

**general description of the standard analysis.*

Performance Indicator B.3.1.1. For the evaluated domain, the evaluation commission will be provided with at least one paper or some other relevant contribution per doctoral student who has obtained a doctor's title within the past 5 years. From this list, the members of the evaluation commission shall randomly select 5 such papers / relevant contributions per doctoral study domain for review. At least 3 selected papers must contain significant original contributions in the respective domain.



- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself
- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. All finished PhD theses fulfil this criteria.

Recommendations:

- 1. My recommendation is again about the increasing of patents and other transfer knowledge options instead of publication in order to finish the doctoral thesis in order to increase the possibilities of collaborations with the industry and other related sectors.**
- 2. Increase the possibilities to publish in open access.**

Performance Indicator *B.3.1.2. *The ratio between the number of presentations of doctoral students who completed their doctoral studies within the evaluated period (past 5 years), including posters, exhibitions made at prestigious international events (organized in the country or abroad) and the number of doctoral students who have completed their doctoral studies within the evaluated period (past 5 years) is at least 1.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself
- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The Doctoral field - Environmental Engineering do not have doctoral students who completed their doctoral studies. 2018 was the year to start the doctoral studies in the field of Environmental Engineering at the Polytechnic University of Bucharest.

Recommendations:

- 1. My recommendation is about the increasing of seminars and other kinds of participation, not only in International Conferences but also for Science outreaching in order to increase the popularisation of the research they do in all of the Society. The University can have a unit related to Science Outreaching and the PhD students should do some collaboration in this field, for example in primary or secondary schools, bars, companies, and so on.**

Standard B.3.2. *The Doctoral School engages a significant number of external scientific specialists in the commissions for public defense of doctoral theses in the analyzed domain.*

**general description of the standard analysis.*

Performance Indicator *B.3.2.1. *The number of doctoral theses allocated to one specialist coming from a higher education institution, other than the evaluated IOSUD should not exceed two (2) in a year for the theses coordinated by the same doctoral thesis advisor.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself



- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The Doctoral field - Environmental Engineering do not have doctoral students who completed their doctoral studies. 2018 was the year to start the doctoral studies in the field of Environmental Engineering at the Polytechnic University of Bucharest.

Recommendations:

- 1. Try to increase the quantity of teachers with the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates, the co-tutelage and the international supervisors.**

Performance Indicator *B.3.2.2. *The ratio between the doctoral theses allocated to one scientific specialist coming from a higher education institution, other than the institution where the defense on the doctoral thesis is organized, and the number of doctoral theses presented in the same doctoral study domain in the doctoral school should not exceed 0.3, considering the past five years. Only those doctoral study domains in which minimum ten doctoral theses have been presented within the past five years should be analyzed.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The Doctoral field - Environmental Engineering do not have doctoral students who completed their doctoral studies. 2018 was the year to start the doctoral studies in the field of Environmental Engineering at the Polytechnic University of Bucharest.

Recommendations:

- 1. Try to reinforce the English language of the personnel of the University and the documents related to the doctoral theses.**

Domain C. QUALITY MANAGEMENT

**general description of domain analysis.*

Criterion C.1. Existence and periodic implementation of the internal quality assurance system

**general description of the criterion analysis.*

Standard C.1.1. There are an institutional framework and procedures in place and relevant internal quality assurance policies, applied for monitoring the internal quality assurance.

**general description of the standard analysis.*

Performance Indicator C.1.1.1. *The Doctoral school in the respective university study domain shall demonstrate the continuous development of the evaluation process and its internal quality assurance*



following a procedure developed and applied at the level of the IOSUD, the following assessed criteria being mandatory:

- (a) the scientific work of Doctoral advisors;
- (b) the infrastructure and logistics necessary to carry out the research activity;
- (c) the procedures and subsequent rules based on which doctoral studies are organized;
- (d) the scientific activity of doctoral students;
- (e) the training program based on advanced academic studies of doctoral students;
- (f) social and academic services (including for participation at different events, publishing papers etc.) and counselling made available to doctoral students.

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. The doctoral school demonstrate all of the criteria during the process and there are enough rules and personnel to fulfill all of the quality assurance of the program.

Recommendations:

1. Try to increase the social activities among all PhD students from the University.
2. Try to add a unit or a department related to the psychological help of the students.
3. Try to add more publicity (using different media options) in all of the possibilities the PhD students have during the doctorate. The students are more focused on the doctoral thesis and they do not know the possibilities they have apart from the doctoral thesis.

Performance Indicator *C.1.1.2. Mechanisms are implemented during the stage of the doctoral study program to enable feedback from doctoral students allowing to identify their needs, as well as their overall level of satisfaction with the doctoral study program in order to ensure continuous improvement of the academic and administrative processes. Following the analysis of the results, there is evidence that an action plan was drafted and implemented.

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. The students need to do 2 reports per year in order to demonstrate the continuous training and scientific research during the doctoral degree.

Recommendations:

1. Try to increase the items in the reports for giving all options apart from the research and training.
2. Try to increase the presentations of the students in seminars within all program to other PhD students.

Criterion C.2. Transparency of information and accessibility of learning resources

**general description of the criterion analysis.*



Standard C.2.1. Information of interest to doctoral students, future candidates and public interest information is available for electronic format consultation.

**general description of the standard analysis.*

Performance Indicator C.2.1.1. The IOSUD publishes on the website of the organizing institution, in compliance with the general regulations on data protection, information such as:

- (a) the Doctoral School regulation;
- (b) the admission regulation;
- (c) the doctoral studies contract;
- (d) the study completion regulation including the procedure for the public presentation of the thesis;
- (e) the content of training program based on advanced academic studies;
- (f) the academic and scientific profile, thematic areas/research themes of the Doctoral advisors within the domain, as well as their institutional contact data;
- (g) the list of doctoral students within the domain with necessary information (year of registration; advisor);
- (h) information on the standards for developing the doctoral thesis;
- (i) links to the doctoral theses' summaries to be publicly presented and the date, time, place where they will be presented; this information will be communicated at least twenty days before the presentation.
 - description of the facts, the findings from the assessed institution's documents and the evaluation visit itself
 - analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled. The information is in Romanian language.

Recommendations:

- 1. Try to use also English language in the information data.**
- 2. Try to increase some items related to science outreaching activities of the PhD students in order to give more publicity and importance to this kind of activities.**
- 3. Try to give more publicity of this information to all PhD students in different media.**

Standard C.2.2. The IOSUD/The Doctoral School provides doctoral students with access to the resources needed for conducting doctoral studies.

**general description of the standard analysis.*

Performance Indicator C.2.2.1. All doctoral students have free access to one platform providing academic databases relevant to the doctoral studies domain of their thesis.

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself
- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself



The indicator is fulfilled. The doctoral students have free access to different academic databases; however, sometimes they have problems to access at home.

Recommendations:

1. Try to increase the possibilities to have access at home.
2. Try to add a repository of papers from all of the Institution.
3. Try to give more publicity of the platforms about academic database to all PhD students in different media.

Performance Indicator C.2.2.2. Each doctoral student shall have access, upon request, to an electronic system for verifying the degree of similarity with other existing scientific or artistic works.

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled.

I do not have any recommendation in this indicator.

Performance Indicator C.2.2.3. All doctoral students have access to scientific research laboratories or other facilities depending on the specific domain/domains within the Doctoral School, according to internal order procedures.

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is totally fulfilled. The students have not only access to all infrastructure of the environmental engineering PhD domain, but also some infrastructure of other institutions based on internal procedures.

Recommendations:

1. Try to increase the possibilities of collaboration with other faculties and programs for a better use of the infrastructure.
2. Try to increase at institutional level, the funding for the maintenance of all of the infrastructure.

Criterion C.3. Internationalization

**general description of the criterion analysis.*

Standard C.3.1. There is a strategy in place and it is applied to enhance the internationalization of doctoral studies.

**general description of the standard analysis.*



Performance Indicator *C.3.1.1. IOSUD, for every evaluated domain, has concluded mobility agreements with universities abroad, with research institutes, with companies working in the field of study, aimed at the mobility of doctoral students and academic staff (e.g., ERASMUS agreements for the doctoral studies). At least 35% of the doctoral students have completed a training course abroad or other mobility forms such as attending international scientific conferences. IOSUD drafts and applies policies and measures aiming at increasing the number of doctoral students participating at mobility periods abroad, up to at least 20%, which is the target at the level of the European Higher Education Area.

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is partially fulfilled. The students have several ERASMUS agreements and also they can have more possibilities for very-short stays with internal funding. However, there are less than 35% of the doctoral students using this possibility.

Recommendations:

1. Try to increase the number of students doing short-research stays in other institutions abroad.
2. Try to increase the possibilities with not only European institutions but also other international institutions.
3. Try to increase the number of projects related to mobility of personnel (for example under all of the possibilities of the MSCA program)
4. Try to increase the education with other institutions and the mobility exchange in the research projects.

Performance Indicator C.3.1.2. In the evaluated doctoral study domain, support is granted, including financial support, to the organization of doctoral studies in international co-tutelage or invitation of leading experts to deliver courses/lectures for doctoral students.

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

The indicator is fulfilled.

Recommendations:

1. More programs among international institutions can be done.

Performance Indicator C.3.1.3. The internationalization of activities carried out during the doctoral studies is supported by IOSUD through concrete measures (e.g., by participating in educational fairs to attract international doctoral students; by including international experts in guidance committees or doctoral committees etc.).

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself



- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself

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|---|
| The indicator is fulfilled. |
| Recommendations: 1. Increase the number of international PhD students. |

IV. SWOT Analysis

| | |
|---|---|
| <p><u>Strengths:</u></p> <ul style="list-style-type: none"> - the strengths identified throughout the report will be resumed as part of the indicators' analysis. Other general strengths that do not fall within a particular indicator may be formulated. - Scientific quality of the research, with multidisciplinary tasks (very important in environmental topics), novel and innovative topics. - Facilities and infrastructure. | <p><u>Weaknesses:</u></p> <ul style="list-style-type: none"> - the weaknesses identified throughout the report will be resumed as part of the indicators' analysis. Other general weaknesses that do not fall within a particular indicator may be formulated. - Industrial collaborations. They need to increase the importance of doing other kinds of results (patents and other knowledge transfer activities). This can be converted in opportunities. - Science outreaching activities. Increase the activities related to the popularisation of the research to all of the Society. - |
| <p><u>Opportunities:</u></p> <ul style="list-style-type: none"> - possible lines of action for the development of the institution under review shall be identified; - examples of opportunities: a favorable economic environment in the proximity of the assessed institution, the uniqueness of the study programs and their relevance to the local/national market, the overall attractiveness of the study programs etc. - Good opportunities in collaborations with other institutions at national and international levels. - Increase the mobility programs for mobility and PhD students from abroad. - Financial support of the PhD students with research projects | <p><u>Threats:</u></p> <ul style="list-style-type: none"> - the possible causes of the deficient aspects (the causes of the identified weaknesses), which are practically the threats to the proper functioning of the institution, shall be identified; - besides, there may be external threats, such as: the inopportune economic environment in the proximity of the assessed institution, the conduct of low attractiveness study programs for both candidates and the labor market etc. - Publication in open access fees. The program can study the possibility to generate some funding related to this topic. On the other hand, the program can study the possibility to prepare a repository of publications - Training courses. Increase the possibilities for future competences of the PhD students and also the possibilities for coordinators. |

V. Overview of judgments awarded and of the recommendations

In the following table I have only added the critical indicators.

| No. | Type of indicator (*, C) | Performance indicator | Judgment | Recommendations |
|-----|--------------------------|-----------------------|-------------------|---|
| 1 | A.2.1.1 - Critical | | Totally fulfilled | <ul style="list-style-type: none"> - Try to increase the use of all of the infrastructure in order to do some external analysis apart from the research and teaching activities. This can be useful to increase the possibilities of collaboration with the industry in the main areas of the program. - Try to increase the possibilities of collaboration with other faculties and programs for a better use of the infrastructure. - Try to increase at institutional level, the funding for the maintenance of all of the infrastructure. |
| 2 | A.3.1.1 – Critical | | Fulfilled | <ul style="list-style-type: none"> - Try to use more different criteria apart from the scientific research related to patents and other knowledge transfer for the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates in order to reinforce the collaborations with different institutions in the research and to increase the innovation. - Try to increase the training of teachers in order to increase the advisors meeting the criteria. |
| 3 | A.3.2.1- Critical | | Totally fulfilled | <ul style="list-style-type: none"> - Try to use more different criteria apart from the scientific research related to patents and other knowledge in order to reinforce the collaborations with different institutions in the research and to increase the innovation. - Try to increase the training programs related to writing papers and proposals for all teachers at the University in order to increase the quantity of teachers as supervisors of doctoral thesis. - Increase the funding and possibilities to publish in open access. |
| 4 | B.2.1.5 - Critical | | Fulfilled | <ul style="list-style-type: none"> - Try to increase the quantity of teachers with the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates. - Try to increase the co-tutelage with specialists in industries or with more international researchers related to the environmental engineering topics (see Indicator A3.1.3). - Try to increase the number of coordinators from other institutions and from abroad. |
| 5 | B.3.1.1 – Critical | | Fulfilled | <ul style="list-style-type: none"> - My recommendation is about the increasing of patents and other transfer knowledge options instead of publication in order to finish the doctoral thesis in order to increase the possibilities of collaborations with the industry and other related sectors. - Increase the possibilities to publish in open access. |
| 6 | C.2.1.1 - Critical | | Fulfilled | <ul style="list-style-type: none"> - Try to use also English language in the information data. - Try to increase some items related to science outreaching activities of the PhD students in order to give more publicity and importance to this kind of activities. - Try to give more publicity of this information to all PhD students in different media. |

The recommendations contained in the report shall be resumed in the indicators' analysis. Other general recommendations may be made that do not fit within a particular indicator.

VERY IMPORTANT!!! – Each identified weakness must be correlated with at least one recommendation to improve the situation!

VI. Conclusions and general recommendations

Several important issues raised during the evaluation are resumed and some general conclusions are drawn on the quality of the education provided within the doctoral study domain under review; the Experts' Panel also presents general assessments about the institution. Other general recommendation may also be presented, which cannot be related to a specific indicator and have not been presented at point V.

A decision is proposed, together with the reasons for granting it (if the Experts' Panel members do not reach a consensus, each of them can propose and argue his/her own decision).

In conclusion, under my opinion, the Doctoral field - Environmental Engineering, at the Polytechnic University of Bucharest, fully complies with the assessment. All critical indicators are fulfilled and from the rest of indicator, only the following ones are partially fulfilled:

- **A.1.3.2. Some PhD students in the environmental engineering domain receive additional funding sources from research projects.**
- **B.2.1.1. The PhD students have 5 mandatory courses during the PhD degree, 3 of them for all PhD students and 2 of them about the speciality; however, because of the different possibilities and futures of the PhD students, the courses should be increased, especially in subjects related to research, innovation, outreaching and enterperneuship.**
- **C.3.1.1. The students have several ERASMUS agreements and also they can have more possibilities for very-short stays with internal funding. However, there are less than 35% of the doctoral students using this possibility.**

In order to fulfill these three indicators, the following recommendations are given:

- 1. Try to increase the institutional budget of all PhD students in order to avoid the use of other funding to complete the salary of the PhD student. In this way, the budget of other projects can be used to be able to hire technicians and other types of contracts that greatly help in the research work of the faculties included in the environmental engineering domain.**
- 2. Try to have enough salary for all PhD students in the program.**
- 3. In addition, the institution can increase the budget for funding small research groups in order to promote these kinds of groups.**
- 4. Try to increase the number of courses (they can be optional) in the PhD program, especially in subjects related to research, innovation, outreaching and enterperneuship.**
- 5. Try to increase the practical part of the courses in the program. For example, the PhD students can prepare a project and a scientific paper at the end of some courses.**

6. Try to increase the number of students doing short-research stays in other institutions abroad.
7. Try to increase the possibilities with not only European institutions but also other international institutions.
8. Try to increase the number of projects related to mobility of personnel (for example under all of the possibilities of the MSCA program)
9. Try to increase the education with other institutions and the mobility exchange in the research projects.

In addition to these recommendations, the following weaknesses and threats are identified:

1. Industrial collaborations. They need to increase the importance of doing other kinds of results (patents and other knowledge transfer activities). This can be converted in opportunities.
2. Science outreaching activities. Increase the activities related to the popularisation of the research to all of the Society.
3. Publication in open access fees. The program can study the possibility to generate some funding related to this topic. On the other hand, the program can study the possibility to prepare a repository of publications
4. Training courses. Increase the possibilities for future competences of the PhD students and also the possibilities for coordinators.

VII. Annexes

The following types of documents shall be attached:

- *The detailed schedule of the evaluation visit – MANDATORY.*
- *The survey questionnaire applied to doctoral students or academic staff in the doctoral study domain under review, the results - optional (e.g., in graphic form) and their interpretation - if applicable.*
- *Scanned documents – any document requested from the IOSUD during the evaluation visit and received, which is not found in the internal evaluation file received before the visit and referred to in the report.*
- *Pictures – if relevant issues are raised regarding the condition of the student residences, cafeterias, premises for teaching and learning activities, library etc.*
- *Screenshots/Print screens of the Doctoral School/IOSUD website proving specific claims in the report, accompanied by the date when they were accessed and saved.*
- *Any other documents relevant to the evaluation process referred to in the report.*