

A R A C I S

Romanian Agency for Quality Assurance in Higher Education

Evaluation of the Doctoral Programme Mathematics

University of Pitești, România

I n t e r n a t i o n a l E x p e r t R e p o r t

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Peer of several
European Quality Assurance Agencies

I. Introduction

I.1 Context of this evaluation

This report summarizes my findings as International Expert from the Evaluation of the Doctoral Programme Mathematics at the University of Pitești (UPIT) by ARACIS from November 22 to 26, 2021. In order to perform the evaluation of the doctoral studies within the Doctoral Schools at UPIT, ARACIS has nominated an evaluation team of 40 experts (Mission Director Prof.univ. Dr. Nicoleta Corbu, Mission Scientific Coordinator Prof.univ. Dr. Răzvan Nistor, International Expert Prof.univ. Dr. Kristijan Kotarski, PhD Student Expert Dalban Costel-Marian, IOSUD Expert Prof.univ. Dr. Diana Cupșa, IOSUD Expert Prof.univ. Dr. Iulian Boldea, IOSUD Expert Prof.univ. Dr. Dorel Aiordăchioaie, IOSUD Expert Prof.univ. Dr. Dana Bădău, IOSUD Expert Prof.univ. Dr. Negru Viorel, Technical Secretary Conf.univ. Dr. Carmen Sirbu and three peers (Coordinator, International Expert, PhD Student) for each of the 10 doctoral study domains of UPIT. For the Doctoral Programme Mathematics, the Coordinator Prof.univ. Dr. Radu Păltânea, the International Expert Prof.Dr. Winfried Müller and the PhD Student Constantin Munteanu were appointed. In view of the Covid-19 pandemic this evaluation was organized in hybrid format. ARACIS and UPIT arranged online conferences and a one day on-site visit on November 24 to UPIT by the Romanian evaluation team members in order to perform the required examinations.

Overall, I want to congratulate ARACIS and IOSUD at UPIT for having made this evaluation possible under difficult conditions. I am very grateful to the Mission Director Prof.univ. Dr. Nicoleta Corbu for conducting this extraordinary evaluation process in a very efficient and careful way and for her friendly way of holding contact with me, preparing the evaluation so well and providing all necessary information and support for the procedure. I also want to thank the Coordinator Prof.univ. Dr. Radu Păltânea of the evaluation team for the doctoral domain Mathematics for his friendly way holding contact with me. My special thanks go to the Technical Secretary Conf.univ. Dr. Carmen Sirbu for giving me the opportunity to participate in this evaluation and for her assistance.

I also give my cordial thanks to the Director of IOSUD at UPIT Prof.univ. Dr. Marius Enachescu and to Prof.univ. Dr. Loredana Bălilescu from the Doctoral Programme Mathematics for the friendly welcome and for assisting me with additional information during the visit. Last but not least I want to thank the interpreters providing translations into English during the meetings and the technicians establishing the connections.

I.2 Organizational Details of the University of Pitești (UPIT) with a focus on the Doctoral Programme Mathematics

The University of Pitești was founded as a state university in 1991. As an entity UPIT has evolved from the Higher Education Institute in Pitești which was established in 1974 by a merger of the Pedagogic Institute Pitești founded in 1962 and the Institute of Sub-Engineers founded in 1969. The headquarter of UPIT is located in Strada Târgu din Vale nr. 1, 110040, Pitești. Teaching activities are offered beside in Pitești also in Alexandria, Câmpulung,

Râmnicu, Vâlcea and Slatina. UPIT consists of 6 Faculties (Sciences, Physical Education and Informatics; Mechanics and Technology; Electronics, Communications and Computers; Theology, Letters, History and Arts; Economic Sciences and Law; Education, Social Sciences and Psychology) which are structured in 16 Departments, to which are added the Department of Teacher Training, the Center for Part-Time Education and the Non-University Tertiary College.

By Government Decisions no. 738 and 739 from 31.08.2020 the fields, specializations, bachelor and master programmes of UPIT for the academic year 2020/21 were approved.

According to its genesis UPIT has a strong tradition in teacher education and its technical disciplines. With its engineering disciplines UPIT contributes considerably to the local and regional needs of economy and is an important partner for the local car industry.

The main financial resources of the University come from the government and from student fees. According to the provided information the total budget of UPIT for 2021 is about 95.000.000 Lei.

In the academic year 2021/22 out of 580 positions for teachers only 360 are occupied and 220 are vacant. In addition, there are 149 didactic and research persons and 56 retired persons working on contract. At the Mathematics Department there are 19 teaching positions occupied (Professor 1, Conferențiar 4, Lector 13, Assistant 1) and 11 positions vacant.

UPIT is governed by the Senate, the Administrative Council, the Rector, the Vice-Rectors and the Director of the Council of Doctoral Studies (CSUD). The Senate provides the legal framework and rules for the operational management of the institution. It consists of 51 members (13 students). The Rector together with 4 Prorectors is responsible for the operational management of the institution and represents the institution to the outside. The Administrative Council is formed by the Rector, the 4 Prorectors, the Director of CSUD, the 6 Deans, the Administrative Director and one student representative.

The University has land and buildings for teaching and learning, sports, student hostels and canteens mainly in Pitești. In Mathematics there are 3 laboratories for doctoral activities. The library offers 406 places and there are 100 additional places in study rooms of the Faculty of Sciences, Physical Education and Informatics.

In the academic year 2020/21 there were 70 PhD students (58 tax paying, 12 with grants) enrolled at UPIT. In the Mathematics domain are 5 students (3 tax paying, 2 with grants).

UPIT has established a Department for Quality in Education already in 1999.

UPIT is situated in the capital city of Argeș County in the South Muntenia region of Romania. This is one of the most industrialized regions (automobile industry) of Romania. But there is the disadvantage to be very close to the capital Bucharest and other cities with well recognized universities.

UPIT has a very complex structure with five locations and a big diversification with respect to established faculties and offered study programmes.

II. Methods and Tools used in the Evaluation

My observations are based on the analysis of the Internal Evaluation Report of the University Doctoral Programme Mathematics (IER-Mathematics) and the Internal Evaluation Report of IOSUD University of Pitești (IER-UPIT), documents concerning the legal framework for IOSUD in Romania and guidelines for the external evaluation of IOSUD provided by ARACIS, the homepage of UPIT, the information obtained from the online interviews during the evaluation and the feedback received from Romanian evaluation team members after the on-site visit. In order to complete my view of the doctoral domain Mathematics, I received on request additional information from the Director of CSUD (cf. enclosed documents “Additional Information”). Furthermore, I studied the reports from the ARACIS Institutional Evaluation of UPIT in 2017 and the EUA Institutional Evaluation of UPIT in 2013.

In preparation and during the evaluation I attended the following online-meetings arranged by ARACIS and UPIT:

Monday, 22.11.2021	Online meetings
09.00 - 10:00 35 connected devices	IOSUD and domain evaluation panel members (technical meeting preparing the evaluation)
10:15 - 11:15 51 connected devices	IOSUD and domain evaluation panel members & representatives of UPIT
12:45 – 13:45 6 connected devices	Evaluation panel members Mathematics & Contact person Mathematics and the drafting team of IER-Mathematics
15:45 - 16:45 8 connected devices	Evaluation panel members Mathematics & Doctoral supervisors Mathematics

Tuesday, 23.11.2021	Online meetings
09:00 - 10:00 7 connected devices	Evaluation panel Mathematics members & PhD students
10:15 - 11:15 *) 61 connected devices	IOSUD evaluation panel members & UPIT PhD students
11:30 - 12:30 36 connected devices	IOSUD and domain evaluation panel members & Ethic Commission
14:00 - 15:00 10 connected devices	Evaluation panel Mathematics members & Doctoral graduates

15:15 - 16:15 *) 54 connected devices	IOSUD evaluation panel members & UPIT PhD graduates
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Wednesday, 24.11.2021	Site visit to UPIT
10:30 – 18:00	Romanian IOSUD and domain evaluation panel members

Thursday 25.11.2021	Online meetings
11:00 - 12:00 6 connected devices	Evaluation panel members Mathematics & Directors of research
15:00 - 16:00 51 connected devices	IOSUD and domain evaluation panel members & CEAC / QA Department
16:15 – 17:15 59 connected devices	IOSUD and domain evaluation panel members & Stakeholders

Friday 26.11.2021	Online meetings
10:00 - 11:00 36 connected devices	IOSUD and domain evaluation panel members (technical conclusion meeting)
12:00 - 12:15 52 connected devices	IOSUD and domain evaluation panel members & representatives of UPIT (conclusion meeting)

I attended the meetings marked with *) in addition to the meetings planned for domain evaluation panel members in order to complete my view on the domain Mathematics.

III. Analysis of ARACIS's performance indicators

Domain A. INSTITUTIONAL CAPACITY

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

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.*

UPIT was granted the capacity to organize doctoral studies in technical areas by government decision from 23.07.1997 (Annex I.1.1.3). In 2016 the 10 existing doctoral schools within UPIT

were confirmed by the government to be parts of IOSUD-UPIT (Annex I.1.1.4). By decision of the Senate of UPIT from 29.03.2021 the doctoral schools of Biology, Mathematics, Informatics and Mechanical Engineering were merged into the existing Interdisciplinary Doctoral School consisting now of the doctoral domains Materials Engineering; Electronic Engineering, Telecommunications and Information Technologies; Industrial Engineering; Mechanical Engineering; Mathematics; Informatics; Biology. In addition, Physical Education and Sports; Automotive Engineering; Philology are doctoral schools within IOSUD-UPIT.

In-force legal provisions and regulations set by the Senate for doctoral studies are respected (National Law of Education 1/2011 with subsequent amendments and completions, Charter of UPIT (Anexa A.I.2), Regulation on the organization and development of doctoral studies within IOSUD (Anexa A.I.32)).

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;

The regulations for IOSUD-UPIT are documented in the Internal Evaluation Report of IOSUD (IER) and Annexes. The Regulations of the Interdisciplinary Doctoral School with the doctoral field Mathematics are published in Annex I.1.1.6 and were verified and confirmed in the meetings during the evaluation.

(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;

The election processes for the Council of the Interdisciplinary Doctoral School (CSDI) are clearly defined and follow legal requirements (cf. Annexes II.A.1.1.1.1 to II.A.1.1.1.8). CSDI consists of 3 teachers and one student (currently Prof.univ. Nicolae-Doru Stănescu - Director, Prof.univ. Eduard-Laurențiu Nițu, Prof.univ. Adriana-Gabriela Plăiașu, student Claudiu-Ionuț Malea).

(c) the Methodologies for organizing and conducting doctoral studies (for the admission of doctoral students, for the completion of doctoral studies);

Methodologies are clearly defined and documented (cf. Annexes I.1.3.4, I.1.1.2, I.2.2.1, I.2.2.2, II.1.1.1.9, II.A.1.1.1.10, II.A.1.1.1.11, II.A.1.1.1.12, II.A.1.1.1.13). But the majority of the documents is available only in Romanian and on UPIT's homepage there is only very few information for international students in English.

(d) the existence of mechanisms for recognizing the status of a Doctoral advisor and the equivalence of the doctoral degree obtained abroad;

There exist clear regulations (cf. Annexes II.A.1.1.1.14, II.A.1.1.1.15).

(e) functional management structures (Council of the doctoral school), giving as well proof of the regularity of meetings;

Due to the pandemic CSDI had a series of skype meetings (05.07.21, 07.07.21, 08.07.21, 15.07.21, 19.7.21, 11.08.21, 20.08.21, 26.08.21, 27.08.21)

(f) the contract for doctoral studies;

The templet for the contract for doctoral studies 2020-2021 is documented in Annexes II.A.1.1.1.18, and II.A.1.1.1.19. It stipulates the rights and obligations assigned to IOSUD/CSDI, to the doctoral students, and to the doctoral advisors.

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 topics of the doctoral study programs are established through discussions with the scientific director and the student. Thereby, the Internal Plan for Research-Development-Innovation is taken into account. After approval by CSDI the topics are included in the study contract (cf. IER Mathematics).

Recommendations:

The indicator is fulfilled.

Performance Indicator A.1.1.2. *The doctoral school's 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 regulation on the organization and development of doctoral university studies in the Interdisciplinary Doctoral School provide criteria, procedures, and mandatory standards with respect to the admission of new doctoral advisors (as well as regulations for the revocation), the decision-making process for training programmes of the doctoral study, the change of a doctoral advisor, the circumstances the doctoral programme can be interrupted, the prevention of fraud and plagiarism, the access to research resources, the students' attendance obligations (cf. Annex I.1.1.6).

Recommendations:

The regulations should be also published in English language and easy to find placed on the homepage.

The indicator is fulfilled.

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

**general description of the standard analysis.*

IOSUD-UPIT and SDI have the logistical resources and have set all necessary steps to carry out the doctoral study Mathematics.

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*

There exists an IT system to keep track of all doctoral students for each year of study, the team of mentors for each doctoral student, the training programme for doctoral students, activities (exams, reports), interruptions of studies.

Recommendations:

The indicator is fulfilled.

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

UPIT has implemented an anti-plagiarism system following the technical specifications of the sistemantiplagiat.ro platform (cf. <https://sistemantiplagiat.ro>). Examples of several checks of theses in Mathematics are documented in the annexes.

Recommendations:

The indicator is fulfilled.

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.*

By international standards in mathematics the project activity (research and consultings) is very low or even does not exist.

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

There was one proposal for the PCS2020 competition, which has not been funded. Another proposal to PCE2021 is still under consideration. Other research grants do not exist.

Recommendations:

Assistance for the application for European funds should be strengthened. Project activities in research and consultings should be intensified. Socio-economic relations with the region should be strengthened and extended. Present examples of good consultings and services to potential partners. Try to sign mutual contracts of co-operations in order to make income from collaborations and to provide research grants for PhD students. Support entrepreneurial activities of staff, graduates and students.

The indicator is partially fulfilled.

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

Currently there is no funding beside government funding. If the proposed project "Mathematical analysis of fluid-solid interactions and homogenization" by Prof. Loredana Bălilescu will be approved by PCE2021 it will provide research grants to 3 PhD students.

Recommendations:

Cf. Recommendations under A.1.3.1.

The indicator is partially fulfilled.

Performance Indicator *A.1.3.3.¹ *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

According to the internal regulations (cf. Annex II.A.1.3.3.1) 20% of the tuition fees of PhD students have to be used to reimburse professional training expenses of doctoral students. But it is not clear how much money is actually paid to the students. From the meetings with the students (Mathematics and other PhD disciplines) it became clear that there was not enough funding for international activities (conferences abroad, etc.) and that the procedure of distribution of funds is not transparent. The lack of financial support of doctoral students is complicated by the fact that the Mathematics domain up to now has no income from research projects or contracts with enterprises.

Recommendations:

Make fully visible how much money really arrives the students.

For the benefit of the region and in general of the Romanian society, the Mathematics domain at UPIT should be more active with respect to the acquisition of research projects (national and European projects) and consulting activities with enterprises.

The indicator is partially fulfilled.

¹ 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.

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.*

According to the provided written information, the data from the homepage and the observations made during the on-site visit, the patrimony of UPIT is well managed. Buildings, lecture rooms, research facilities, and student service installations are up to date.

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 laboratories of the Department of Mathematics and Informatics as well as the Research Center *Calculation methods and programming methodologies* together with the Library of UPIT provide the necessary infrastructure for doctoral studies in Mathematics. Due to a lack of detailed financial information it is not possible to state the investments within the past 5 years.

Recommendations:

Make better visible the investment into the research infrastructure.

Increase efforts for the acquisition of national and European research projects in order to upgrade the infrastructure in Mathematics and Informatics.

The indicator is fulfilled.

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.*

The didactic and research staff affiliated to the Mathematics domain is highly qualified and complies with the legislation. But the number of PhD supervisors in Mathematics should be increased and some supervisors from abroad should be included. As Mathematics is an international discipline, internationalization is very important for this field.

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 doctoral domain Mathematics meets the required legal standards with respect to doctoral advisors. But the number of doctoral supervisors includes only 3 professors, from which one is extern and one is retired.

Recommendations:

Increase and internationalize the body of doctoral supervisors.

The indicator is fulfilled.

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

Two of the three PhD supervisors have a full-time employment contract at UPIT. But one of them is also tenured professor at another university.

Recommendations:

Cf. recommendations under A.3.1.1.

The indicator is fulfilled.

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

All professors meet the legal requirements for their activities within the doctoral domain Mathematics.

Recommendations:

The indicator is fulfilled.

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 programs² 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

Currently there are only 5 PhD students in Mathematics. There is one supervisor with 3 students and another with 2 students.

Recommendations:

The indicator is fulfilled.

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

All three doctoral advisors of the Mathematics' domain are highly qualified and internationally recognized researchers. But as already mentioned, there is only one of them fully working at UPIT, one is professor of the University of Bucharest and one is professor emeritus of the Ovidius University Constanța.

Recommendations:

The indicator is fulfilled.

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*

² 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 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

Two of the three supervisors are very active in their scientific field and the third supervisor is an internationally recognized professor emeritus.

Recommendations:

The indicator is fulfilled.

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*

Two PhD students with a master from another university stated clearly that they came to UPIT for their doctoral studies because of the supervisors and the offered research fields at UPIT.

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 not clearly formulated.

Three graduates of other institutions enrolled for the doctoral admission contest within the past five years. There was one seat funded by the state budget. The number of candidates within the past five years was seven.

Recommendations:

Please clarify what you want. For me the ratios (students from outside) : (all students) and (number of grants) : (all students) would make sense.

The indicator is probably fulfilled.

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

**general description of the standard analysis.*

There were no new students enrolled in the years 2018 and 2019.

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 admission regulations are clearly defined and documented (cf. Annex II.A.1.1.1.9). But some legal constraints such as international PhD candidates have to prove the knowledge of the Romanian language hinders the recruitment of international students. The scientific language in Mathematics is English.

Recommendations:

Try to change legislation with respect to the requirement to command Romanian for international PhD students.

The indicator is fulfilled.

Performance Indicator B.1.2.2. The expelling rate, including renouncement / dropping out of doctoral students 3, respectively 4, years after admission³ does not exceed 30%.

- 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

During the past five years out of 7 enrolled PhD students one student dropped out and one student moved to another university. Hence, the drop out rate is 14%, ignoring the student transferring to another institution.

Recommendations:

The indicator is fulfilled.

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.*

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.

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 training program does not contain any assistance for the elaboration and presentation of scientific papers in English language. Some students would probably benefit also from further knowledges concerning statistical data processing. Furthermore, PhD students should not only follow passively advanced lectures. They should be more active themselves presenting their results in seminars.

Recommendations:

I recommend to focus the training program not only on advanced topics of analysis and to strengthen the abilities of students to present their results by the inclusion of doctoral seminars, where the students have to learn how to present scientific results in English language. As procedures and methods of Statistics play an important role in many applications of Mathematics, a course on this topic should also be included into the training programme. Synergies between related PhD domains should be used (Do students in Mathematics and in Informatics need separate courses in Ethics?).

The indicator is fulfilled.

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*

Ethics and Academic Integrity are part of the training programme.

Recommendations:

Synergies between related PhD domains should be used.

The indicator is fulfilled.

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 activities⁴.*

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

⁴ 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.

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

UPIT has defined learning outcomes for the doctoral field Mathematics based on the mission of the field (cf. Annex II.B.2.1.3.1). The learning outcomes describe the preparation of highly qualified specialists who can successfully work in many different areas (e.g. modelling, simulation, security, information technology, data analysis, etc.). But I was not able to find any information on the learning outcomes on UPIT's homepage, even not in Romanian language.

Recommendations:

The training programme does not contain any assistance for the elaboration and presentation of scientific papers in English language.

Make learning outcomes of the PhD study Mathematics in Romanian and English language publicly available for interested persons.

The indicator is fulfilled.

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

All doctoral students in Mathematics benefit from the advice of qualified tutoring committees (cf. IER Mathematics, page 39).

Recommendations:

The indicator is fulfilled.

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

Currently there are 5 PhD students in the domain and 6 teachers providing their guidance.

Recommendations:

The indicator is fulfilled.

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

All five doctoral students who obtained the PhD degree during the past five years have published several articles (cf. IER Mathematics, p. 40). All papers contain new results on the problems discussed.

Recommendations:

The indicator is fulfilled.

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

Between 2016 and 2018 there were 7 presentations at conferences and 5 doctoral students who completed their studies. Probably caused by the pandemic there were no presentations in 2020 and 2021. The majority of the stated conferences were international conferences organized by Romanian universities.

Recommendations:

In order to increase international visibility and to gain international experience, I recommend to motivate and support students for the attendance of international conferences outside Romania too.

The indicator is fulfilled.

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.*

In all commissions for public defense of doctoral theses worked between 1 and 3 external scientists.

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

This indicator is fulfilled already because of the small number of PhD students.

Recommendations:

The indicator is fulfilled.

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

There were only 5 theses presented in the last five years.

Recommendations:

The indicator is not applicable.

Domain C. QUALITY MANAGEMENT

**general description of domain analysis.*

Not least by the influence of ARACIS, quality assurance and quality management have a high value at Romanian universities. UPIT has established many instruments in order to monitor and improve quality in all fields of doctoral education.

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

**general description of the criterion analysis.*

The Interdisciplinary Doctoral School, where the field Mathematics belongs, applies internal evaluation and quality procedures developed by CEAC together with IOSUD.

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

IOSUD monitors the scientific activity of doctoral advisors. The infrastructure and logistics in the domain Mathematics are annually evaluated by the Council of the Scientific Research of UPIT. The doctoral study Mathematics at UPIT is organized according to the "Regulation for the organization and development of university doctoral studies within IOSUD University of Pitești". Admission procedures and obligations of doctoral students are regulated. The scientific activity of doctoral students is evaluated by the advisors and the mentors committee. The training program is an annex to the doctoral studies contract of each student. There are rules for the distribution of funds for PhD students (participation in conferences, publication of articles, materials necessary for research, etc.). But the amount of grants is very small and it is not transparent how much money is actually given to students supporting their research activities.

Recommendations:

Try to increase the number of grants for PhD students by acquiring other sources than the government (European funds, contracts with private companies, etc.) and make support fully transparent to students.

The indicator is fulfilled.

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

Within the Interdisciplinary Doctoral School a questionnaire developed by CEAC for identifying the needs and satisfaction of doctoral students is evaluated once a year. Students appreciate the procedure.

Recommendations:

The indicator is fulfilled.

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

**general description of the criterion analysis.*

Everything is clearly regulated but there is only very limited information available in English language.

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.*

PhD candidates have all important information on UPIT's homepage. But it is very difficult to find this information and there is practically no information in English for interested international students.

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*

All relevant information for doctoral students, potential candidates and doctoral advisors is publicly available via the links given on pages 47 and 48 of the IER Mathematics. But without knowledge of the links the information is difficult to find.

Recommendations:

Make access to the information on PhD studies better visible and provide all the information in English language too.

The indicator is fulfilled.

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.*

Doctoral students in Mathematics have access to the resources they need in order to conduct their studies.

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

Doctoral students have free access to online platforms including the platform ANELIS.

Recommendations:

The indicator is fulfilled.

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

Doctoral students can verify the degree of similarity of their own thesis together with their supervisor using the SEMLAG software.

Recommendations:

The indicator is fulfilled.

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 doctoral students in Mathematics conduct their research activities mainly in the laboratories of the Calculation methods and programming methodologies Research Center and the Library.

Recommendations:

The indicator is fulfilled.

Criterion C.3. Internationalization

**general description of the criterion analysis.*

Mathematics is an international discipline and the same mathematics is taught and studied in all regions of our world. The international language in Mathematics is English.

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.*

The internationalization strategy of UPIT and the doctoral domain Mathematics is not very visible. There are strong connections with one Chilean university but no other significant cooperations. Against my expectations, in the meeting with students of the domain only one student spoke fluently English.

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

UPIT has signed an Erasmus mobility agreement on the level of doctoral studies with Vilnius University. UPIT is also a partner of the "Eugen Ionesco" scholarships. Out of five doctoral students who obtained the PhD in the evaluation period four participated in international conferences. However, the majority of conferences attended were international conferences organized at Romanian universities.

Recommendations:

The Interdisciplinary Doctoral School at UPIT should develop a clear internationalization strategy and strengthen internationalization at home. Especially in Mathematics it should not be a problem to offer courses within the training program in English language. Participation of doctoral students at international conferences organized abroad should be increased. The recruitment of international students should be intensified.

The indicator is partially fulfilled.

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 funding exists, but currently there are no doctoral supervisors coming from a foreign research institution. But within the proposed research programme "Mathematical analysis of fluid-solid interactions and homogenization" the funding of foreign experts for coming to UPIT is intended.

Recommendations

Internationalization should be strengthened. The doctoral domain Mathematics should try to include also international experts into the supervision of doctoral theses.

The indicator is partially fulfilled.

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

There exist financial support for international activities. But it is not clear how much money is really spent on these activities. One international expert is involved in the guidance of three doctoral students. As long as there are strong legal restrictions for international students (they have to know the Romanian language) and the majority of the relevant information for doctoral

candidats on UPIT's homepage is only in Romanian, the attraction of foreign students will not be successful.

Recommendations:

Intensify links to the international scientific community in mathematics. Increase international cooperations for the supervision of PhD theses and their defending. Look for international co-advisors. Increase the financial support for PhD students attending international conferences abroad and performing international research activities. Provide relevant information for foreign doctoral candidates in English and try to change the legal requirement to command Romanian for foreign PhD students.

The indicator is partially fulfilled.

IV. SWOT Analysis

<p><u>Strengths:</u></p> <ul style="list-style-type: none"> - Good research infrastructure, - Support from the local community. - Young and committed PhD supervisors, - High qualification of doctoral advisors - Graduates of the PhD programme Mathematics are wanted specialists in the industrial region of Pitești and create a positive scientific impact to the development of the region. 	<p><u>Weaknesses:</u></p> <ul style="list-style-type: none"> - The number of doctoral supervisors in Mathematics is too small. From the 3 supervisors one is extern and another one is retired. Only 2 supervisors are scientifically activ. - Important managers of IOSUD-UPIT are extern. - There is no funded research and there are no consulting contracts in Mathematics. As a consequence, financial support for PhD students is poor. - There is no visible internationalization strategy. - There exists an extrem fragmentation of disciplines. As a consequence, possible synergies are not used (e.g. between Informatics and Mathematics).
<p><u>Opportunities:</u></p> <ul style="list-style-type: none"> - Favorable economic environment in the proximity of UPIT. - Growing demand of our it-based society for highly qualified specialists. - Existence of national and European research programmes. 	<p><u>Threats:</u></p> <ul style="list-style-type: none"> - UPIT is very close to the capital Bucharest and other cities with well recognized universities. - Complex infrastructure with five locations. - Big diversification with respect to faculties and study programmes. - Legal requirement for international PhD students to command Romanian.

V. Overview of judgments awarded and of the recommendations

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
1.	PI	<p>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:</p> <p>a) the internal regulations of the Doctoral School;</p> <p>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;</p> <p>c) the Methodologies for organizing and conducting doctoral studies (for the admission of doctoral students, for the completion of doctoral studies);</p> <p>d) the existence of mechanisms for recognizing the status of a Doctoral advisor and the equivalence of the doctoral degree obtained abroad;</p> <p>e) functional management structures (Council of the doctoral school), giving as well proof of the regularity of meetings;</p> <p>f) the contract for doctoral studies;</p> <p>g) internal procedures for the analysis and approval of proposals regarding the training for doctoral study programs based on advanced academic studies.</p>	Fulfilled	
2.	PI	<p>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.</p>	Fulfilled	The regulations should be also published in English language and easy to find placed on the homepage.
3.	PI	<p>A.1.2.1. The existence and effectiveness of an appropriate IT system to keep track of doctoral students and their academic background.</p>	Fulfilled	
4.	PI	<p>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.</p>	Fulfilled	

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
5.	IP	<p>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.</p>	Partially fulfilled	<p>Assistance for the application for European funds should be strengthened. Project activities in research and consultings should be intensified. Socio-economic relations with the region should be strengthened and extended. Present examples of good consultings and services to potential partners. Try to sign mutual contracts of co-operations in order to make income from collaborations and to provide research grants for PhD students. Support entrepreneurial activities of staff, graduates and students.</p>
6.	PI *	<p>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%.</p>	Partially fulfilled	Cf. recommendations under A.1.3.1.
7.	PI *	<p>A.1.3.3. 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.).</p>	Partially fulfilled	<p>Make fully visible how much money really arrives the students. For the benefit of the region and in general of the Romanian society, the Mathematics domain at UPIT should be more active with respect to the acquisition of research projects (national and European projects) and consulting activities with enterprises.</p>
8.	CPI	<p>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</p>	Fulfilled	<p>Make better visible the investment into the research infrastructure. Increase efforts for the acquisition of national and European research projects in order to upgrade the infrastructure in Mathematics and Informatics.</p>

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		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		
9.	CPI	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.	Fulfilled	Increase and internationalize the body of doctoral supervisors.
10.	PI *	A.3.1.2. At least 50% of all doctoral advisors have a full-time employment contract for an indefinite period with the IOSUD.	Fulfilled	Cf. recommendations under A.3.1.1.
11.	PI	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.	Fulfilled	
12.	PI *	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 programs does not exceed 20%.	Fulfilled	
13.	CPI	A.3.2.1. At least 50% of the doctoral thesis advisors in the evaluated domain have at least 5 Web of Science- or FRIH-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	Fulfilled	

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		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.		
14.	PI *	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	Fulfilled	
15.	PI *	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.	Probably fulfilled	Please clarify what you want. For me the ratios (students from outside) : (all students) and (number of grants) : (all students) would make sense.
16.	PI *	B.1.2.1. Admission to doctoral study programs is based on selection criteria including: previous academic, research and professional	Fulfilled	Try to change legislation with respect to the requirement to command

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		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.		Romanian for international PhD students.
17.	PI	B.1.2.2. The expelling rate, including renouncement / dropping out of doctoral students 3, respectively 4, years after admission does not exceed 30%.	Fulfilled	
18.	PI	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.	Fulfilled	I recommend to focus the training program not only on advanced topics of analysis and to strengthen the abilities of students to present their results by the inclusion of doctoral seminars, where the students have to learn how to present scientific results in English language. As procedures and methods of Statistics play an important role in many applications of Mathematics a course on this topic should also be included into the training programme. Synergies between related PhD domains should be used (Do students in Mathematics and in Informatics need separat courses in Ethics?).
19.	PI	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.	Fulfilled	Synergies between related PhD domains should be used.
20.	PI	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 activities.	Fulfilled	The training programme does not contain any assistance for the elaboration and presentation of scientific papers in English language. Make learning outcomes of the PhD study Mathematics in Romanian and English language publicly available for interested persons.
21.	PI	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	Fulfilled	

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		written guidance and feedback or regular meeting.		
22.	CPI	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.	Fulfilled	
23.	CPI	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	Fulfilled	
24.	PI *	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.	Fulfilled	In order to increase international visibility and to gain international experience, I recommend to motivate and support students for the attendance of international conferences outside Romania too.
25.	PI *	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.	Fulfilled	
26.	PI *	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	Not applicable	

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		been presented within the past five years should be analyzed.		
27.	PI	<p>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:</p> <p>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.</p>	Fulfilled	<p>Try to increase the number of grants for PhD students by acquiring other sources than the government (European funds, contracts with private companies, etc.) and make support fully transparent to students.</p>
28.	PI *	<p>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.</p>	Fulfilled	
29.	CPI	<p>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:</p> <p>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</p>	Fulfilled	<p>Make access to the information on PhD studies better visible and provide all the information in English language too.</p>

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		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.		
30.	PI	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.	Fulfilled	
31.	PI	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.	Fulfilled	
32.	PI	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.	Fulfilled	
33.	PI *	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.	Partially fulfilled	The Interdisciplinary Doctoral School at UPIT should develop a clear internationalization strategy and strengthen internationalization at home. Especially in Mathematics it should not be a problem to offer courses within the training program in English language. Participation of doctoral students at international conferences organized abroad should be increased. The recruitment of international students should be intensified.
34.	PI	C.3.1.2. In the evaluated doctoral study domain, support is granted, including financial support, to the organization of doctoral studies	Partially fulfilled	Internationalization should be strengthened. The doctoral domain Mathematics should try to include also

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		in international co-tutelage or invitation of leading experts to deliver courses/lectures for doctoral students.		international experts into the supervision of doctoral theses.
35.	PI	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.).	Partially fulfilled	Intensify links to the international scientific community in mathematics. Increase international cooperations for the supervision of PhD theses and their defending. Look for international co-advisors. Increase the financial support for PhD students attending international conferences abroad and performing international research activities. Provide relevant information for foreign doctoral candidates in English and try to change the legal requirement to command Romanian for foreign PhD students.

VI. Conclusions and general recommendations

The Doctoral Programme Mathematics is part of the Interdisciplinary Doctoral School of IOSUD-UPIT. All significant legal requirements (Romanian legislation and ARACIS performance indicators concerning doctoral studies) are more or less respected. Doctoral studies in Mathematics at UPIT are important for the region. The teachers are internationally recognized experts.

Nevertheless, there are some areas, where the Doctoral Domain Mathematics should set further steps of improvement:

A. Institutional Capacity

The research infrastructure is fine. As very often in Mathematics there are only few students. But the number of doctoral supervisors is too small. Actually there are 3 professors, from which one is titular, one is extern and one is retired.

Recommendations: Extend the team of doctoral supervisors in Mathematics with a new titular member.

Make fully transparent financial support used for training expenses of doctoral students.

B. Educational Effectiveness

PhD graduates in Mathematics are wanted specialists. The PhD education Mathematics at UPIT conforms more or less to international standards. But at many European universities PhD students in Mathematics benefit from grants coming from research or project income. Financial support for PhD students in Mathematics at UPIT is poor.

The concentration of the training programme to the first year is problematic. Active parts for students such as doctoral seminars where students have to present their results also in English

language are missing in the training. The extrem fragmentation of disciplines hinders the use of synergies (e.g. between Informatics and Mathematics).

Recommendations: Increase the financial support for PhD students by the generation of income from research and consulting projects. Strengthen efforts for the acquisition of national and European research projects for a continuous upgrading of the infrastructure in Mathematics and Informatics.

Expand the training programme for PhD students over two years in order to have more time giving advice and guidance to students and to strengthen links between the University and PhD students. Include active parts for the students in the training and make use of synergies between related disciplines.

C. Quality Management

Not least by the influence of ARACIS, quality assurance and quality management have a high value at Romanian universities and at UPIT.

The Interdisciplinary Doctoral School has established recently its own QA procedures. The effect and benefit of this decentralization has to be observed.

The relevant information for doctoral students, potential candidates and doctoral advisors exists but is not easy to find. There is practically no information in English language.

Mathematics is an international discipline. But the internationalization strategy of the doctoral domain Mathematics is not very visible. International activities are focused on one supervisor with strong connections to a Chilean university.

Recommendations:

The relevant information about the Doctoral Programme Mathematics should be placed easy to find at UPIT's homepage in Romanian and English language.

PhD students of Mathematics should be more supported and encouraged to present their results also at international conferences organized outside Romania.

The domain Mathematics should strengthen internationalization at home by offering courses in English language and attracting more foreign students.

VII. Remarks on the ARACIS Evaluation Procedure for Doctoral Study Domains

The ARACIS evaluation procedure for doctoral study domains is strictly conducted in correspondance with the European Association for Quality Assurance in Higher Education (ENQA). The focus is on performance indicators in the areas "Institutional Capacity" , "Educational Effectiveness" and "Quality Management". The ARACIS evaluation procedure for doctoral study domains is an important step for quality assurance of doctoral education in Romania. The process is very well organized and works with excellent peers. But the procedure is more or less an inspection and as a consequence evaluated institutions and domains try to present themselves as good as possible and do not mention any weaknesses or problems. I am

missing in the procedure the motivation to think on organizational and qualitative improvements. Evaluated institutions should be encouraged to be also self-critical and to make better use of the evaluation by looking also into the future and not only into the past.

My remarks and recommendations should assist the Doctoral Domain Mathematics and ARACIS to proceed their successful way for high quality doctoral education in Mathematics.

VIII. Annexes

- *Detailed schedule of the evaluation visit*
- *Additional Information*

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