

The External Evaluation Report of a Doctoral Study Domain

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I. Introduction¹

In this chapter, the following are summarized:

- the context in which this external evaluation report was drafted (**the type of evaluation, the period of the evaluation visit, the composition of the Experts Committee** etc.);
- details about the doctoral school(s) of which the doctoral domain under review is part (number of doctoral advisors, number of students, institutional context, short history etc.);
- details about the doctoral study domain under review (number of students, institutional context, short history etc.).

The present External Evaluation Report is based on the Self Assessment Report on the Doctoral Field in Mathematics provided by the Technical University of Cluj-Napoca, several online meetings with employers' representatives, members of the school council / doctoral schools (CSD) members, PhD students, PhD supervisors, old graduate students, etc. Due to the present COVID-19 scenario, it was not possible for the external evaluator to visit the Department / University. In the Expert Committee for Mathematics, there are three members, Prof. Univ. Dr. Marin Marin (internal), Prof. Dr. Qamrul Hasan Ansari (External) (My self) and Constatin Munteanu (PhD student).

The Mathematics Field of the Doctoral School, IOSUD-TUCN, comes from the Doctoral School of Mathematics, North University of Baia Mare (UNBM). Since 2012, it operates as a field of doctoral studies in Mathematics, within the Doctoral School of the Technical University of Cluj-Napoca. There are 11 PhD supervisors within the Mathematics Doctoral Field, IOSUD-TUCN. Several of them have very high reputation in the World as a mathematician and they regularly publishing high quality of research papers in SCI journals. The PhD supervisors have published more than 300 research papers with an average 27 papers in SCI journals. Out of 11 PhD supervisors, 9 meet the CNATDCU minimum standard. There are 45 PhD

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



students in which 25 are regular period of studies. They are involved in current and hot topics within the mathematics field and are used to participate in international conferences.

The mission and vision of the Mathematics Domian are very high. As mentioned in the Self Assessment Report, Mathematics Domain has modern and well equipped laboratories and computing facilities. As I know perosnally, some of PhD advisors are renowned researchers. They have wide specturum of research area and working in the current / hot topics in mathematics.

II. Methods used

This chapter will contain the methods and tools used in the external evaluation process, before and during the evaluation visit, including at least:

- The analysis of the internal evaluation report of the doctoral study domain under review and its Annexes;

- The analysis of documents made available by the IOSUD, in physical format, during the evaluation visit (if such documents have been requested);

- The analysis of documents, data and information available on the IOSUD/Doctoral School(s) website, in electronic format;

- Visiting the buildings included in the institution's property, comprising (indicative and non-exhaustive list, which shall be changed according to the context):

- classrooms;
- laboratories;
- the institution's library;
- research centers;
- the Career Counselling and Guidance Center;
- lecture halls for students;
- the student residences;
- the student cafeteria;
- sports ground etc.;

- Meeting/discussions with doctoral students in the doctoral study domain under review;

- Meeting/Discussions with the graduates of the doctoral study domain under review;

- Meeting/Discussions with employers of the graduates in the doctoral study domain under review;

- Meeting/Discussions with the school officials of the Doctoral School(s) in which the doctoral study domain under review is operating;

- Meeting/Discussions with the doctoral advisors in the doctoral study domain under review;

- Meeting/discussions with the representatives of the various structures of the IOSUD/Doctoral School(s) in which the doctoral study domain under review is operating:

- The Council of the Doctoral School, the University Senate, the Board of Directors, the Quality Assessment and Assurance Commission, the Quality Assurance Department, the Ethics Commission (including with the student representatives of these structures);
- the Career Counselling and Guidance Center;
- student organizations;
- secretariats;



- various departments/administrative offices (Social/Student residences-Cafeterias etc.);
- Application of questionnaires to doctoral students or academic staff in the doctoral study domain under review.

The method of evaluation is used on the prescribed format provided by the ARACIS. It is based on the Self Assessment Report and several online meetings with employers' representatives, members of the school council / doctoral schools (CSD) members, PhD students, PhD supervisors, old graduate students, etc. Due to the present COVID-19 senero, it was not possible for the external evatulator to visit the Department / University.

During the discussion with several online meetings, it is found that almost all the students are very much satisfied with the facilities provided by the university. No old student had any complaint about the facilities in the university. Most of the students are very much safisfied with their PhD advisor and working in the hot / current topic in their field.

III. Analysis of ARACIS's performance indicators

Domain A. INSTITUTIONAL CAPACITY

**general description of domain analysis.*

The Technical University of Cluj-Napoca (TUCN) comprises two university campuses, Cluj-Napoca and Baia Mare. The organizational structure gives the university a strong regional dimension which differentiates it from other universities in Romania. The TUCN has a very high image for the development technology, advanced scientific research, innovation and astistic creation. The TUCN is the member of several international associations, agencies and organizations. As mentioned in the self assessment report, TUCN is among top tweleve universities in Romania.

In the Domain of Mathematics, there are 11 PhD supervisors, most of them are well known mathematicians and have very high research publication. There are 45 PhD students; 25 are regular period of srudies and 36 are regular period of studies and studies extension.

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

**general description of the criterion analysis.*

The Technical University of Cluj-Napoca is well organized and run with its own regulations, methodologies and procedures developed in accordance with national regulations and legislation.

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.*

Legislative framework, regulations of IOSUD, organizing and conduct of the competition for admission, methodology to conduct the election of CSUD, etc are framed according to the national policy.



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*

Recommendations:

The indicator is fulfilled.

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*

Recommendations:

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.*

The Technical University of Cluj-Napoca has an University Information System (SINU) to record the doctoral students and their academic career by using "Management of doctoral students". There is a Doctoral School digitization platform which is a web application consisting 10 modules that provides electronic management of information flows in the doctoral school. There is also an integrated system for evaluating teaching, research and managerial activities.



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

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

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.*

It seems that the TUCN has its own mechanism to make sure that the financial resources are used optimally, and the revenues obtained from doctoral studies are supplemented. There were 10 research grants where PhD supervisors affiliated to the field of Mathematics participated as members (9 grants) or as project director (1 grant). However, there is currently no grant in implementation.

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

Recommendations:

The indicator is 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

Recommendations:

The indicator is fulfilled.

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

Recommendations:

The indicator is fulfilled.

Criterion A.2. Research infrastructure

**general description of the criterion analysis.*

The Technical University of Cluj-Napoca has enough research infrastructure, namely, computers, specific softwares, laboratory equipments, library, access to international data, etc. The research infrastructure and the office of research services are presented publicly through a profile platform.

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.*

As mentioned in the self assessment report, the mathematics domain also has ERRIS (Engage in the Romanian Research Infrastructures System) Research Center for Applied Mathematics in Engineering Sciences and Baia Mare Research Center "Fundamental and Applied Mathematics" which is

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.



recognized by CNCSIS as Type B1 Research Center. The research team in Nonlinear Analysis of CUNBM has its own research laboratory with all necessary facilities.

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

Recommendations:

The indicator is fulfilled.

Criterion A.3. Quality of Human Resources

**general description of the criterion analysis.*

There are 11 PhD supervisors in the Mathematics Domain with different and wide range of specializations. Out of 11 PhD supervisors, 9 meet the CNATDCU minimum standard and are very good in their field of specialization. However, some are excellent and very well-known in their specialization. One of the supervisors received High-Cited award during 2019-2020.

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.*

Mathematics Domain has sufficient well qualified staff to ensure the conduct of doctoral study program as mentioned in the self assessment report. One PhD supervisor out of 11 coordinates more than 8 doctoral students at the same time. All PhD supervisors together have published more than 300 research papers in SCI journals which is a very high number.

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

Recommendations:



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

Recommendations:

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

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 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

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.*

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.



All PhD supervisors have at least 5 research papers in SCI journals. PhD supervisors in Mathematics have published more than 300 research papers in SCI journals. Several doctoral supervisors are members of editorial board of international journals and also participated as key-note speakers in international conferences during last five years. One of the PhD supervisor is the Editor-in-Chief of a reputed mathematical journal.

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

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 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

Recommendations:

The indicator is fulfilled.

Domain B. EDUCATIONAL EFFECTIVENESS

*general description of domain analysis.

During the PhD course, all students, under the coordination of scientific leaders, develop the skill to publish their work as scientific research publication in WOS / ISI, BDI journals. The PhD supervisors



encourage to all PhD students to participate and to present their research work in national / international conference / workshops.

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

**general description of the criterion analysis.*

The Mathematics Domain has the capacity to attract a large number of candidates from outside the institution or more candidates than the position financed from the government.

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.*

Because of the high reputation of Mathematics Domain, many students from other universities try to join TUCN.

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

Recommendations:

The indicator is fulfilled.

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

Recommendations:



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 admission⁴ 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

Recommendations:

The indicator is fulfilled.

Criterion B.2. The content of doctoral programs

**general description of the criterion analysis.*

The training programme is based on advanced academic studies. The TUCN has an Advanced University Training Program (PPUA) for doctoral students. During the last 5 years, 8 subjects have been taught.

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.*

During the last 5 years, 8 subjects have been taught. PhD students also have group discussion in their research group with their PhD advisors. PhD advisors give some scientific research training to their doctoral students.

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

Recommendations:

The indicator is fulfilled.

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.



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

Recommendations:

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 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

Recommendations:

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

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

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.



Recommendations:

The indicator is fulfilled.

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

**general description of the criterion analysis.*

As mentioned in the self assessment report, in the evaluation field, at least one scientific paper or another relevant contribution per doctoral student is required. Besides one research publication, students learn the skill of research and teaching. Several PhD students have already presented their work in International Conferences / Workshops.

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.*

According to the rule of the TUCN, a student needs only one research paper to be accepted or published. Of course, they are encouraged to present their work in international conferences.

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

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

Recommendations:



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.*

As mentioned in the self assessment report, the number of doctoral theses assigned to a reviewer from a higher education institute within Roomania or abroad, other than the evaluated IOSUD, must not exceed two in the case of the theses coordinated by the same doctoral supervisor per year.

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

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

Recommendations:

The indicator is fulfilled.

Domain C. QUALITY MANAGEMENT

**general description of domain analysis.*

The TUCN has a system to monitor internal quality assurance.

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

**general description of the criterion analysis.*



In order to achieve the quality assurance of doctoral students, UTCN established Commission for Quality Assessment and Assurance (CEAC) which monitors and coordinates the implementation of the quality function at institution level, Office for Quality Assurance which is responsible for coordinating the quality assurance process, and Quality Manager for implementation.

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.*

All doctoral students are annually evaluated according to the procedures developed at the level of the Doctoral School and IOSUD.

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

Recommendations:

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

Recommendations:

The indicator is fulfilled.



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

**general description of the criterion analysis.*

Without transparency of information and accessibility of learning resources no institution can grow and establish its reputation. It should contain the procedure to induct PhD students, their topics, and abstract of theses, etc. All such criterion are followed by the Mathematics Domain in particular and TUCN in general.

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.*

It is very important to upload the PhD theses of the PhD students on the website of the university or the department. A web page dedicated to doctoral studies is available which includes content of study programs, scientific profile and thematic areas / research topics of the PhD supervisors, a list of doctoral 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*

Recommendations:

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.*



As mentioned in the self assessment report, all doctoral students can access to the resources required to successfully complete the doctoral programme.

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

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

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

Recommendations:

The indicator is fulfilled.

Criterion C.3. Internationalization

**general description of the criterion analysis.*

The Technical University of Cluj-Napoca in general and Doctoral Field of Mathematics in particular are one of the best universities in Romania and having a strategy to internationalize the PhD program. There are very good supervisors in mathematics domain and some of them are internationally well-known, even then the Mathematics Domain is unable to attract many PhD students from abroad.

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 Technical University of Cluj-Napoca in general and Mathematics Domain in particular encourage PhD students to go for abroad for the internship, conferences and training programs. There is a language support program in the form of tutoring and English language workshops / classes to stimulate international mobility of PhD students. UTCN also provides the financial support to PhD students selected on the basis of objective criteria to boost the participation of the PhD students in international conferences.

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

Recommendations:

The indicator is 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

Recommendations:

The indicator is 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

Recommendations:

The indicator is fulfilled.

IV. SWOT Analysis

<p><u>Strengths:</u> - Most of the doctoral supervisors are very strong in their area of research. Some of them are well known around the world. One of the PhD supervisors is high-cited. Nonlinear Analysis laboratory is very strong and publishing high quality of research papers</p>	<p><u>Weaknesses:</u> -Poor funding of Doctoral students from research grants and basic university funding. Research grant are extremely low -No foreign PhD student</p>
<p><u>Opportunities:</u> As I known there are some well-known mathematician in the Mathematics Domain. They can attract many foreign PhD students.</p>	<p><u>Threats:</u> - No threat</p>

V. Overview of judgments awarded and of the recommendations

No.	Type of indicator (*, C)	Performance indicator	Judgment	Recommendations
1.		A.1.1.1	Satisfied	
2.		A.1.1.2	Satisfied	
3.		A.1.2.1	Satisfied	
4.		A.1.2.2	Satisfied	
5.		A.1.3.1	Satisfied	
6.	*	A.1.3.2	Satisfied	
7.	*	A.1.3.3	Satisfied	
8.	C	A.2.1.1	Satisfied	
9.	C	A.3.1.1	Satisfied	
10.	*	A.3.1.2	Satisfied	
11.		A.3.1.3	Satisfied	
12.	*	A.3.1.4	Satisfied	
13.	C	A.3.2.1	Satisfied	
14.	*	A.3.2.2	Satisfied	
15.	*	B.1.1.1	Satisfied	
16.	*	B.1.2.1	Satisfied	
17.		B.1.2.2	Satisfied	

18.		B.2.1.1	Satisfied	
19.		B.2.1.2	Satisfied	
20.		B.2.1.3	Satisfied	
21.		B.2.1.4	Satisfied	
22.	C	B.2.1.5	Satisfied	
23.	C	B.3.1.1	Satisfied	
24.	*	B.3.1.2	Satisfied	
25.	*	B.3.2.1	Satisfied	
26.	*	B.3.2.2	Satisfied	
27.		C.1.1.1	Satisfied	
28.	*	C.1.1.2	Satisfied	
29.	C	C.2.1.1	Satisfied	
30.		C.2.2.1	Satisfied	
31.		C.2.2.2	Satisfied	
32.		C.2.2.3	Satisfied	
33.	*	C.3.1.1	Satisfied	It is recommended to attract foreign PhD students
34.		C.3.1.2	Satisfied	
35.		C.3.1.3	Satisfied	

VI. Conclusions and general recommendations

All the indicators mentioned above are satisfied. Therefore, I strongly recommend the accreditation of the domain (mathematics) by ARACIS. However, I would like to suggest that there should be a strategy to attract international PhD students, specially, from Mideast, North Africa, South Asian Countries, Indian Subcontinent. Since Romania is not that expansive as western Europe, I think it would not be so difficult task. There is a need to admit more PhD students as there are enough high quality PhD supervisors in the department. The financial support through research project should be increased.

VII. Annexes

The following types of documents shall be attached:

- *The detailed schedule of the evaluation visit – MANDATORY.*