



The External Evaluation Report of a Doctoral Study Domain

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Introduction

Type of Evaluation: Periodical External Evaluation

Department: „Lucian Blaga“ University of Sibiu, Doctoral study domain Mathematics

Period of the evaluation visit: July 19 – July 23 2021

Committee: Octavian Agratini (Coordinator), Ajda Fošner (International expert), Sebastian-Aurelian Ștefăniță (PhD student)

The Lucian Blaga University of Sibiu was founded in 1990, with five faculties: Engineering and Sciences; Language Sciences; History and Law; Medicine; Food and Textile Processing Technology. Nowadays, there are 10 faculties and departments. Faculty of Sciences offers bachelor and master level study programs in Mathematics, Informatics, Environmental Sciences, Physics, Biology, Physical Education, Sports and PhD in the field of Mathematics. Students are involved in research programs conducted through the four research centers of the faculty: Research center in informatics and information technology, Applied ecology research center, Research center for complex physical systems, Research center in mathematics and applications.

In 1990, one of the first study programmes offered by the newly established University of Sibiu was Mathematics. Then, a group of academics with extensive experience in teaching mathematics at the Institute of Higher Technical Education in Sibiu decided to lay down the foundation stone for the programme Mathematics and Informatics. When the Bologna system was adopted for all the three levels of study (Bachelor's, Master's, Ph.D.), Mathematics became one of the many academic fields on offer at Lucian Blaga University of Sibiu and the study programme in Mathematics and Informatics was successfully accredited in accordance with the applicable provisions of the System. In 2003, two four-semester Master's programmes were introduced: Mathematics and Applied Informatics, and Didactics of Mathematics. Each year both Bachelor's and Master's programmes in these two fields are fully occupied.

The doctoral activity is coordinated by CSUD, consisting of 8 members, namely: CSUD Director, the representative of the doctoral supervisors in CSUD, 5 doctoral supervisors appointed by the Decision of the Rector of ULBS and a representative of the doctoral students. The interdisciplinary doctoral school is coordinated by the Council of the Interdisciplinary Doctoral School (CSDI), consisting of 4 members, respectively: SDI Director, 1 PhD supervisor from IOSUD-ULBS, a scientific personality from outside IOSUD-ULBS and a representative of doctoral students.

In the period 2015-2020, the situation of SDI-ULBS regarding the number of doctoral students is as follows:

	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Total Phd students	356	380	416	449	479



During the analyzed period, 220 doctoral students completed their doctoral studies and obtained the scientific title of doctor.

In 2019, the doctoral programme in Mathematics within the Interdisciplinary Doctoral School was established. The Mission of the Interdisciplinary Doctoral School of IOSUD ULBS (SDI-ULBS) is to model researchers and specialists (doctors) capable of performing at the highest possible levels in their scientific research, as well as in practical professional activity, by allowing the assimilation into the work force of a human resource competent in its particular field of scientific research and possessing a rich professional experience accrued through the bestowal of the doctoral degree in all 15 doctoral programmes.

Three doctoral advisors who have been recently granted the right to supervise theses are currently affiliated with the programme: Professor Ana Maria Acu, Professor Nicolae Secelean, and Professor Laurian Suci. They have vast experience in both teaching and research and are actively involved in a wide range of academic pursuits. In 2020, Professor Ludovic Dan Lemle, joined the doctoral programme as doctoral advisor. During the evaluation visit current teaching staff pointed out that it is their intention to enrol other doctoral advisors provided that they meet the applicable national standards and are awarded the right to supervise theses. In the first academic year 2019/2020 no student was enrolled. In 2020/2021, 1 doctoral student was enrolled in the Mathematics Field.

Methods used

Before the evaluation visit we analysed:

- the internal evaluation report of the doctoral study domain under review and its Annexes (those, available in English);
- the documents, data and information available on the IOSUD/Doctoral School(s) website.

Before the evaluation visit we also had an online meeting (12 July 2021) with all evaluation panel members for instructions.

During the evaluation visit, we had the online discussions with:

- doctoral student in the doctoral study domain under review;
- employers of the graduates in the doctoral study domain under review;
- school officials of the Doctoral School(s) in which the doctoral study domain under review is operating;
- doctoral advisors in the doctoral study domain under review;
- 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).

We also had a technical meeting with all evaluation panel members to identify specific issues that needed to be clarified during the evaluation. Visit of the buildings included in the institution's property was not possible because of the pandemic situation and, as a consequence, the remote evaluation.



On the last day of the evaluation we had an online meeting with all evaluation panel members for conclusions and a meeting with representatives of the institution under review to discuss on the conclusions of the evaluation process and the main recommendations.

Analysis of ARACIS's performance indicators

Domain A. INSTITUTIONAL CAPACITY

A general description of the field as well as its particularities are highlighted in this section. Here we used analysis of the internal evaluation report and information available on IOSUD website.

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.

The analysis of the standard is based on the self-assessment file submitted to ARACIS as well as on the discussions held online during the visit July 19-23, 2021.

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.

The doctoral university studies are organized and carried out in accordance with the Regulation on the organization and development of doctoral university studies in ULBS (Annex A.1.1.1.01 Regulation on the organization and development of doctoral university studies in ULBS), the last option being approved by Senate Decision no. 2542 of 26.06.2020. The regulation has 16 chapters and includes aspects related to principles and fields of application, IOSUD, interdisciplinary doctoral school, admission and enrollment of doctoral students, study contract, doctoral supervisors, doctoral students, funding, completion of studies. IOSUD-ULBS is led by the Council for Doctoral Studies (CSUD). The current CSUD-ULBS has a mandate for 4 years, 2020-2024, being composed of 8 members. The methodology for appointing CSUD members is available at:

https://doctorate.ulbsibiu.ro/wp-content/uploads/Regulament_Membrii_CSUD_ULBS_Aprilie_2012-1.pdf.



The note on the organization and conduct of elections for the appointment of the representative of doctoral supervisors in CSUD is available at

https://senat.ulbsibiu.ro/wp-content/uploads/291020/10_Nota%20privind%20organizarea%20si%20desf%20alegerilor%20desemnare%20reprezentant%20conducatori%20doctorat.pdf.

ULBS Senate Decision no. 4873 / 11.12.2020 regarding the appointment by the Rector of ULBS of the CSUD members is available at

<https://senat.ulbsibiu.ro/wp-content/uploads/111220/Hotararea%20Senatului%20ULBS%20nr.%204873%20din%2011.12.2020.pdf>.

Doctoral university study programs are organized and carried out within IOSUD only through doctoral schools. Within IOSUD-ULBS there is only one doctoral school, the Interdisciplinary Doctoral School (SDI-ULBS) which is supervised by a director of the doctoral school and the doctoral school council (CSDI). The Director of SDI-ULBS is appointed by CSUD-ULBS among the PhD supervisors and is a full member of the SDI-ULBS Council (CSDI-ULBS) (Annex A.1.1.1.02 CA Decision No. 8 / 03.03. 2021 on the organization and conduct of elections of SDI board members).

The Council of the Interdisciplinary Doctoral School consists of 4 members. CSUD and CSDI members, PhD supervisors, must meet the minimum and mandatory standards for the granting of the certificate of qualification, specific to the field. The CSUD Director is appointed following a public competition organized by IOSUD-ULBS on the basis of the Methodology for conducting the competition for the position of director of CSUD (Annex A.1.1.1.03 Methodology for conducting the competition for the position of director of CSUD available at https://doctorate.ulbsibiu.ro/wp-content/uploads/Metodologie_concurs_director_CSUD_IOSUD_ULBS.pdf).

The Admission Regulations for doctoral studies are part of the Admission Regulations of ULBS and are developed annually for each admission session (Annex A.1.1.1.04 Admission Regulations 2020 available at <https://doctorate.ulbsibiu.ro/wp-content/uploads/Anexa12-Regulament-ADMITERE-Doctorat-ULBS-2020-2021.pdf>).

Completion of doctoral studies in IOSUD-ULBS is regulated by the Regulation on the organization and conduct of doctoral studies in ULBS and by the Operational Procedure on the evaluation and defence of doctoral theses.

IOSUD-ULBS has developed, according to the regulations, mechanisms for recognizing the quality of doctoral supervisor. There are three distinct procedures that describe how the recognition of the quality of doctoral supervisor:
<https://doctorate.ulbsibiu.ro/ro/legislatie/>
<http://calitate.ulbsibiu.ro/pag/PCUe/Abilitare/Abilitare.php>
<http://calitate.ulbsibiu.ro/pag/PCUe/Doctor/Doctor.php>

The doctoral university contract (Annex A.1.1.1.10 Study contract) contains the rights and obligations of IOSUD-ULBS, doctoral students and doctoral supervisors.

IOSUD-ULBS has internal procedures for approving the proposals of the doctoral university study programs. The field coordinators (as they were nominated by CSUD, according to Decision no. 3/16.02.2021 available at <https://doctorate.ulbsibiu.ro/wp-content/uploads/Hotarare-CSUD-3-16februarie2021.pdf>) discuss with the doctoral supervisors about the training program and about the topics related to the individual training programs, ensuring the novelty, clarity and impact of the topics proposed for research.

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.

The regulations of the doctoral school provide criteria, procedures, and mandatory standards in regard to the following aspects:

- the admission of new doctoral advisors, as well as regulations regarding the manner in which the membership of a doctoral advisor can be revoked if needed;
- the decision-making process in regard to the opportunity, the structure, and the content of the training program of the doctoral studies;
- the procedures in place regarding changing a doctoral advisor with another and guidelines regarding conflict mediation;
- the circumstances in which the doctoral program can be discontinued;
- the prevention of fraud in scientific research, including instances of plagiarism;
- ensuring the access to research resources;
- the doctoral students' attendance obligations, according to a Methodology authored by the Ministry of Education, Research, Youth, and Sport.

Recommendations: /

The indicator is fulfilled.

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

The analysis of the standard was based on the self-assessment file submitted to ARACIS, as well as on the meetings held during the visit July 19-23, 2021.

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.

LBUS has implemented a university-wide digital system for the registration of all enrolled students, the UMS–University Management System, which the students themselves can access with their personal usernames and passwords. The office for doctoral studies has implemented an independent information system in order to keep track of the doctoral students, considering the clear distinctions between the Bachelor's, the Master's, and the doctoral programmes.

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.

The university use the following software for verifying the similarity percentage of doctoral theses: sistemeantiplagiat.ro and Check for plagiarism All the doctoral theses which are submitted to the doctoral schools for verification are passed through both software in order to determine the similarity percentage. The theses whose



percentages fall outside of the allowed limits are not approved for public defence.

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.

The analysis of the standard is based on the documents requested by the commission during the visit because of unclear data in the self-assessment file.

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.

The institutional development grants existing at the time of submitting the self-assessment file are the following:

- Institutional development funds: field 6 - Research of excellence - ULBS, 2016, 2017, 2018, 2019 - workshops;
- Institutional development funds: field 5 - Research of excellence - ULBS, 2016, 2017, 2018, 2019 - training courses;
- Institutional development funds 2018, 2019, 2020:
Area 4: supporting the activities of student entrepreneurial societies (SAS) within universities; and
Area 5: improving the quality of teaching, including compliance with academic ethics.

The above situation concerns the ULBS doctoral school as a whole. We specify that at the time of submitting the file to ARACIS, the field of study Mathematics did not have any students enrolled. In the Commission's view, this indicator should not be taken into account.

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%.

Each academic year, ULBS awards 10 doctoral scholarships. These scholarships are allocated for the entire period of doctoral studies (3 or 4 years). The proportion of doctoral students financially supported by research or institutional development grants is more than 20%. In the category of other funding sources are:

- the award for research results;
- the award for mobility grants;
- employment of doctoral students by IOSUD;
- engaging PhD students in research grants;
- individual contracts through which scholarships are awarded or financial support is provided for the continuation of doctoral studies.



As the Mathematics field has the first doctoral student enrolled on 1.10.2020, it is not necessary to take this indicator into account.

Performance Indicator *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.).

The amounts related to the doctoral grants obtained by the university through institutional contract and the incomes from the tuition fees collected from the doctoral students are centralized at university level.

As the Mathematics field has the first doctoral student enrolled on 1.10.2020, it is not necessary to take this indicator into account

Criterion A.2. Research infrastructure

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

The analysis of the standard is based on the self-assessment file submitted to ARACIS.

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.

The existing research infrastructure consist of the research infrastructure of the Faculty of Sciences, the library and the Center for Research in Mathematics and Applications. In the last 12 months, ULBS has invested approximately 1.000.000 EUR in research infrastructure. ULBS benefits from a donation of 4.200.000 EUR from the Hasso Plattner Institute.

Recommendations: /

The indicator is fulfilled.

Criterion A.3. Quality of Human Resources

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

The analysis of the standard is based on the self-assessment file submitted to ARACIS.



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.

All PhD supervisors in the field of Mathematics meet the national minimum qualification standards according to MENCs Order 6129/2016.

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.

Out of the total of 4 PhD supervisors in Mathematics, 3 are holders of IOSUD ULBS, i.e. 75%.

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.

The disciplines in the training program based on advanced university studies related to Mathematics are supported by doctoral supervisors from the Interdisciplinary Doctoral School, who meet the national minimum qualification standards in force (Annex A.3.1.3. Mathematics CV_Doctoral supervisors with teaching activity):

- Ethics and academic integrity, Prof. Dr. Silvia Florea;
- Scientific research methodology: engineering sciences, exact sciences and life sciences, Prof. Dr. Claudiu Vasile Kifor;
- Functional analysis and applications in approximation theory, Prof. Dr. habil. Ana Maria Acu;
- Probabilistic methods in approximation theory, Prof. Dr. habil. Ana Maria Acu.

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%.

Within the doctoral field Mathematics, a single doctoral supervisor coordinates a single doctoral student, so the indicator is fulfilled.



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.

The analysis of the standard was based on the CVs from the self-assessment file submitted to ARACIS.

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

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.

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.

On the IOSUD website in the Domains and leaders section there is information on doctoral supervisors in each field, including their own CV and List of publications. From their analysis it results that there is a continuous concern of doctoral supervisors for scientific research. The members of the doctoral school are involved in organizing periodic international conferences (International Conferences on Approximation Theory and its Applications, Romanian-German Symposium on Mathematics and its Applications, Symposium on Geometric Function Theory and Applications).

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.

As it results from the lists of papers, doctoral supervisors are active in the scientific research (publishing scientific papers, monographs, participation on conferences etc.) obtaining more than 25% of the score required by the minimum standards.



Recommendations: /

The indicator is fulfilled.

Domain B. EDUCATIONAL EFFECTIVENESS

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

The analysis of the standard is based on the self-assessment file submitted to ARACIS as well as on the discussions held online during the visit July 19-23, 2021.

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.

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.

In the academic years 2015/2016 - 2019/2019 in the field of Mathematics no doctoral student was enrolled. In the academic year 2020/2021 one candidate was enrolled.

This indicator can not be taken into account.

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

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.

The admission contest for doctoral studies is organized in a unitary manner and includes:

- exam of linguistic competence in one of the international languages (English, French, German);
- specialized examination consisting of an interview of the admission commission with the candidate based on the doctoral research project elaborated in accordance with the requirements
- the minimum average that a candidate must obtain in order to be declared admitted to doctoral studies is 7.00.

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%.

This is not the case, because the academic year 2020/2021 is the first in which a candidate is admitted to this program.

Criterion B.2. The content of doctoral programs

The analysis of the standard was based on the self-assessment file submitted to ARACIS, as well as on the discussions held online during the visit July 19-23, 2021.

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

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.

The training program based on advanced university studies related to Mathematics includes four disciplines relevant to the training in scientific research of doctoral students, two of which are mandatory: Ethics and academic integrity and Research Methodology (Annex B.2.1.1. Mathematics Training program based on advanced university studies).

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.

The training program based on advanced university studies related to the field of Mathematics contains the disciplines Ethics and academic integrity and Research Methodology.

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.

The training program based on advanced university studies includes the following:



- Fundamental disciplines: Ethics and academic integrity and Methodology of scientific research that can be found in all fields within the Interdisciplinary Doctoral School;
- Discipline of fundamental field Mathematics;
- Specialized disciplines, at choice depending on the subdomain approached.

The subject sheets include, in addition to the structure of the course/seminar, the competencies that the doctoral students acquire as a result of their completion (Annex B.2.1.3. Mathematics The subject sheets).

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.

The doctoral student benefits from the advice of a guidance commission composed of the doctoral supervisor and 3 other members, specialists in the research direction proposed by the doctoral thesis. The doctoral student maintains contact with the members of the guidance committee via telephone, e-mail, Google Meet, etc. or with face-to-face meetings.

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.

In the field of Mathematics there is 1 doctoral student. The guidance commission is available in Annex B.2.1.5. Mathematics Guidance Committees.

Recommendations: /

The indicator is fulfilled.

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.

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

The analysis of the standard is based on the self-assessment file submitted to ARACIS, as well as on the discussions held online during the visit July 19-23, 2021.

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



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.

This is not the case, because the academic year 2020/2021 is the first in which a candidate is admitted to this program.

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.

This is not the case, because the academic year 2020/2021 is the first in which a candidate is admitted to this program.

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.

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.

This is not the case, because the academic year 2020/2021 is the first in which a candidate is admitted to this program.

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.

This is not the case, because the academic year 2020/2021 is the first in which a candidate is admitted to this program.

Domain C. QUALITY MANAGEMENT

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

The analysis of the field is based on the self-assessment file submitted to ARACIS, as well as on the discussions held online during the visit July 19-23, 2021.



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.

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.

There are a number of IOSUD regulations and procedures through which internal quality assessment and assurance takes place, namely:

- Regulation on the Organization and Conduct of the competition for admission to doctoral studies in 2021-2022;
- Operational procedure regarding online admission to doctoral studies;
- ULBS Regulation on the organization and conduct of doctoral studies, approved in the Senate meeting of 26.06.2020;
- The operational procedure regarding the online development of the examination activities in the interdisciplinary doctoral school of the “Lucian Blaga” University of Sibiu;
- Operational procedure regarding the evaluation and defense of doctoral theses;
- Operational Procedure - Organizing and carrying out the process of obtaining the habilitation certificate;
- The procedure for the automatic recognition by ULBS of the quality of doctoral supervisor obtained in university institutions accredited from abroad;
- The procedure for automatic recognition of the doctor's degree;
- The procedure for automatic recognition of university teaching positions obtained in accredited higher education institutions abroad;
- Procedure for rewarding research results;
- Methodology for approving external mobility grants from Hasso Plattner and ULBS funds.

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.



At the ULBS level, there is a questionnaire based on which feedback is collected from all students, including doctoral students, regarding the doctoral program as a whole. Given that in October 2020 the first PhD student in Mathematics was enrolled, it is not necessary to evaluate this indicator.

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

The analysis of the field is based on the self-assessment file submitted to ARACIS, as well as on the discussions held online during the visit July 19-23, 2021.

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

*general description of the standard analysis.

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

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

All information of interest to doctoral students, potential candidates, and doctoral supervisors is available in electronic format, online, at the following addresses:

- <https://doctorate.ulbsibiu.ro/ro/>
- <https://doctorate.ulbsibiu.ro/ro/admitere/>
- <https://doctorate.ulbsibiu.ro/ro/legislatie/>
- <https://doctorate.ulbsibiu.ro/ro/domenii-si-conducatori/>
- <https://doctorate.ulbsibiu.ro/ro/cursuri/>
- <https://doctorate.ulbsibiu.ro/ro/ordine/>
- <https://doctorate.ulbsibiu.ro/ro/taxe/>
- <https://doctorate.ulbsibiu.ro/ro/teze/teze-2021/>

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.



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.

All PhD students have access, through institutional e-mail accounts, to platforms with academic databases relevant to each field of doctoral studies, namely:

- By AnelisPlus
- Through the ULBS Library access to books, articles, international libraries.

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.

Each doctoral student has access, with the consent of the doctoral supervisor, to the two electronic systems for verifying the degree of similarity.

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.

All PhD students have access to the research infrastructure of the Faculty of Sciences, the library and the Center for Research in Mathematics and Applications.

Recommendations: /

The indicator is fulfilled.

Criterion C.3. Internationalization

The analysis of the field is based on the self-assessment file submitted to ARACIS, as well as on the discussions held online during the visit July 19-23, 2021.

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

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.



ULBS has concluded mobility agreements with universities abroad, with research institutes, with companies that carry out activities in the studied field, aiming at the mobility of doctoral students and teachers (Annex C.3.1.1 ERASMUS agreements for doctoral study cycles).

The PhD student in Mathematics participated in "The 8th European Congress in Mathematics", Portoroz, Slovenia, June 20-26, 2021.

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.

During the evaluation period, in the training program based on advanced university studies, several leading experts were invited to give courses or lectures for doctoral students.

For the field of Mathematics it is not necessary to analyse this indicator.

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.).

The internationalization of the activities within the doctoral studies is supported by:

- Inclusion of ULBS in the EUA Council for Doctoral Education
- Inclusion of ULBS in the Pride Network - the Association for Professionals in Doctoral Education
- Participation in international educational fairs: NAFSA 2019 Washington.

Recommendations: /

The indicator is fulfilled.

SWOT Analysis

<p><u>Strengths:</u></p> <p>The existence of a young team with remarkable professional achievements.</p>	<p><u>Weaknesses:</u></p> <p>The specialized courses proposed by the members of the Mathematics field for doctoral students is reduced, 75% of the teachers involved did not propose any course.</p>
<p><u>Opportunities:</u></p> <ul style="list-style-type: none"> – Recruiting future doctoral students from students who have completed their master's studies in other university centers. – Substantial financial support by private 	<p><u>Threats:</u></p> <p>There is a reduced demand from higher education graduates to pursue a doctorate in Mathematics.</p>

Overview of judgments awarded and of the recommendations

No.	Type of indicator (*, C)	Performance indicator	Judgment	Recommendations
1.	I	A.1.1.1	fulfilled	
2.		A.1.1.2	fulfilled	
3.		A.1.2.2	fulfilled	
4.		A.1.3.1	not the case	
5.		A.1.3.2	not the case	
6.		A.1.3.3	not the case	
7.		A.2.1.1	fulfilled	
8.		A.3.1.1	fulfilled	
9.		A.3.1.2	fulfilled	
10.		A.3.1.3	fulfilled	
11.	*	A.3.1.4	fulfilled	
12.		A.3.2.1	fulfilled	
13.	*	A.3.2.2	fulfilled	
14.		B.1.1.1	not the case	
15.	*	B.1.2.1	fulfilled	
16.		B.1.2.2	not the case	
17.		B.2.1.1	fulfilled	
18.		B.2.1.2	fulfilled	
19.		B.2.1.3	fulfilled	
20.		B.2.1.4	fulfilled	
21.		B.2.1.5	fulfilled	
22.		B.3.1.1	not the case	
23.	*	B.3.1.2	not the case	
24.	*	B.3.2.1	not the case	
25.	*	B.3.2.2	not the case	
26.		C.1.1.1	fulfilled	
27.		C.1.1.2	not the case	
28.		C.2.1.1	fulfilled	
29.		C.2.2.1	fulfilled	
30.		C.2.2.2	fulfilled	
31.		C.2.2.3	fulfilled	
32.	*	C.3.1.1	fulfilled	
33.		C.3.1.2	not the case	
34.		C.3.1.3	fulfilled	

Conclusions and general recommendations

- The doctoral school was established in the academic year 2019/2020. The first doctoral student was enrolled



in the academic year 2020/2021.

- The doctoral school benefits from financial support from the internal private environment and from substantial sponsorships from the Hasso Plattner Foundation from Germany.
- The members of the doctoral school have classical research directions (Approximation Theory) and new research directions (Fractal Theory).
- We recommend to diversify the specialized courses offered to doctoral students in the field of Mathematics.
- We recommend to include in the team of the doctoral school, Mathematics, new doctoral supervisors, including from prestigious universities abroad.
- We recommend to intensify the efforts to attract doctoral students in the field of Mathematics.

Koper, 25 July 2021