

## **The External Evaluation Report of a Doctoral Study Domain**

Contents

I. Introduction

II. Methods used

III. Analysis of performance indicators

IV. SWOT Analysis

V. Overview of judgments awarded and of the recommendations

VI. Conclusions and general recommendations

VII. Annexes

### **I. Introduction<sup>1</sup>**

In this chapter, the following shall be 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.).

Transilvania University of Braşov (UniTBv) organizes doctoral studies within the Institution Organizing Doctoral Studies – Transilvania University of Braşov (IOSUD-UniTBv).

This periodic external evaluation report was carried out for the evaluation of the Systems Engineering doctoral programme of IOSUD “Transilvania” University of Brasov (UTBV).

Type of evaluation: periodic external evaluation

Evaluation visit period: 08 November - 12 November 2021.

Composition of the expert evaluation committee:

1. Prof. Marian Barbu - Expert evaluator RNE, Universitatea ”Dunarea de Jos” Galaţi, Romania
2. Prof. univ. dr. eng. Gabor Kiss - international expert, Obuda University, Budapest, Hungary
3. Florina-Luminiţa Besnea - student doctorand, Universitatea din Craiova, România.

Due to the restrictions of the pandemic crisis, the evaluation was mainly conducted online. Meetings were organized through the platform Zoom in Romanian but with a simultaneous translator service.

Doctoral studies represent the third cycle of university studies and enable the acquisition of an 8-level qualification according to the European Qualifications Framework (EQF) and to the National Qualifications Framework.

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<sup>1</sup> Each time when applicable the information shall be presented gender-wise.



Transilvania University of Braşov (UniTBv) organizes doctoral and post-doctoral studies within the Organizing Institution of Doctoral University Studies - Transilvania University of Braşov, hereinafter referred to as IOSUD- UniTBv (<https://www.UniTBv.ro/cercetare/doctorat-postdoctorat-si-abilitare/iosud.html>). The Rector of Transilvania University Braşov is the legal representative of IOSUD- UniTBv. IOSUD- UniTBv is managed by the Council for University Doctoral Studies, hereinafter referred to as (<https://www.UniTBv.ro/cercetare/doctorat-postdoctorat-si-abilitare/despre-scoala-doctorala/csud>). CSUD- UniTBv, which is headed by a director.

The doctoral university study programmes are organized and conducted within IOSUD-UniTBv, through the Interdisciplinary Doctoral School (SDI) (<https://www.UniTBv.ro/cercetare/doctorat-postdoctorat-si-abilitare/despre-scoala-doctorala/echipa-sdi>). The Interdisciplinary Doctoral School (SDI) is headed by the Director of the doctoral school and the Council of the Interdisciplinary Doctoral School (C-SDI), SDI being integrated in the structure of the Vice-Rectorate for scientific research and informatization.

The Interdisciplinary Doctoral School (SDI) has been operational within IOSUD- UniTBv since the 1st of October 2010, having been established by the Decision of the Senate of Transilvania University of Braşov of July 27, 2010. Previously, according to GD 567/15 June 2005, the Senate Office of Transilvania University of Braşov decided (HBS no. 43 / 09.09.2005) the establishment of the Doctoral Department on 9 September, 2005. The basic mission of this department was to coordinate all doctoral activities at the university.

Currently, the doctoral field Systems Engineering has 3 supervisors and 5 PhD students. A total of 5 doctoral students graduated from the doctoral program in the last 5 years.

## **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.

During the evaluation, the self- assessment report and provided annexes were used as the main elements for the evaluation. This information was complemented with additional documentation, such as the presentations displayed during the online meetings and the physical visit to the educational and research infrastructure.

The online meetings proceeded as scheduled with the different stakeholders: representatives of the institution and of the Council for Academic Doctoral Studies (CSUD), responsible of doctoral domain and the team who drafted the internal evaluation report, doctoral coordinators, PhD students, members of the Ethics Commission, members of the Commission for Quality Evaluation and Assurance, the Directors and persons in charge of the research centers/laboratories, Doctoral Studies Council, employers of doctoral graduates and graduates. The meetings were moderated by the evaluation team, and attendants answered to the question raised by the members of the evaluation panel. In general, all the meeting were satisfactorily carried out and the discussion with attendants helped to clarify the different issues raised by the evaluation members.

### **III. Analysis of ARACIS's performance indicators**

#### ***Domain A. INSTITUTIONAL CAPACITY***

The doctoral school has proven to adopt the institutional framework required by legal regulations to conduct the doctoral studies. The research infrastructure is adequate to support students and supervisors and the quality of human resources is also good and over the required limits except one indicator that is partially fulfilled: A1.3.3.

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



According to the financial situation received from the University of Brasov, from an institutional and managerial point of view, the doctoral school has covered all issues related to the adoption and implementation of the specific regulations for doctoral schools in a mostly satisfactory manner and sufficient financial and logistical resources have been provided to fulfil the mission of doctoral studies, except for the reimbursement of the professional training costs of doctoral students, to which less than 10% is allocated. From the situation presented by the University of Brasov, we must exclude the courses and equipment donated from their own income, so the amount is less than 10%.

It is suggested to provide an English version for the website and the study contract.

*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 Doctoral School has adequately implemented all the aspects included in the specific legislation of doctoral studies. Both indicators under the standard A.1.1. are fulfilled and there is evidence that confirm the application of specific regulations, being this information accessible to all students.

**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 general framework for doctoral training is set out in the IOSUD Institutional Regulations. The internal regulations cover aspects such as the procedures for the election of the Directors of the Council of the Doctoral School (CSD), the members of the SCD and the representatives of doctoral students, the organisation of doctoral studies, including admission procedures, the recognition of doctoral supervisors, the establishment of functional governance structures (Doctoral School Council, CSD) to coordinate doctoral activities, study contracts with all students admitted to doctoral programmes, and internal procedures for the analysis and approval of proposed topics.

The evidence supporting the achievement of the indicator is the general framework and internal procedures of the doctoral school, the study contract and the internal procedures governing the various aspects of the organisation of doctoral studies. In addition, there is evidence that CSD meetings are held on a regular basis, with minutes of the meetings containing the list of participants, the date and the main agreements reached at the meetings.

There are no specific 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 Regulation of the Doctoral School includes procedures for affiliation of new Doctoral supervisors, for the replacement of a Doctoral supervisor of a Doctoral student and conflict mediation, for the conditions under which the doctoral programme may be discontinued, for the detection of possible fraud in the academic and research activities and for ensuring access to research resources. The decision-making content of the training program and the attendance obligations of students are also covered by the internal regulations.

Documentation related to the IOSUD Regulation and the Regulation of the Doctoral School have been provided as evidence of the previous procedures.

There are no specific recommendations.

***The indicator is fulfilled.***

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

The IT system is adequate to keep record and analyse the evolution of doctoral students. Information is easily accessible and facilitates the guidance of students. Yet, the information at the website should be also available in English. Accessibility to anti- plagiarism is also guaranteed.

**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.*

The Information System of the University of Brasov records PhD students' activities: exam results, reports, research activity assessment and participation in national and international scientific events, as well as the publication of some specialized research papers. Supplementary documentation provides a description of the information system, its administration and management procedures and a print screen of a PhD student web page. Each PhD student has access to the system through an account and a password,

There are no specific 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.*

IOSUD ensures the verification of the authenticity and originality of doctoral theses and other research works using [www.sistemantiplagiat.ro](http://www.sistemantiplagiat.ro) software, recognized by the National Council for Attesting the University Titles, Diplomas and Certificates (CNATDCU). The Doctoral School use an other application for verifying the percentage of similarities: **Turnitin** If the similarity index report is inadequate, the Doctoral candidate is recommended to revise the thesis and resubmit it.

During the meetings with supervisors and PhD students, it was confirmed the availability of anti-plagiarism software.

There are no specific 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.*

Financial resources are optimally used. Research projects and grant headed by the PhD advisors provide additional funding for scholarships and for supporting students' expenses associated to their training program. All the indicators are above the required limits except A.1.3.3.

***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.*

In the last 5 years at the level of the SE doctoral field, a number of 15 research projects have been carried out / are being carried out (9 completed in the last 5 years; 6 being implemented) in which the doctoral supervisors in the field had / have the quality of director, respectively project manager. Therefore, the indicator is accomplished.

There are no specific 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%.*

Within Systems Engineering field of doctoral studies, on the reference date 06.04.2021, there was a total number of 5 doctoral students in different training periods, of which 5 are or have been beneficiaries of funding from the state budget. Of these budgeted doctoral students, 1 doctoral student completed his normal (initial contractual) doctoral training period of 3 years, being currently in the additional legal period of grace for the completion and public defense of the doctoral thesis. During this period he no longer benefits from funding from the budget. The number of PhD students who are financed from the state budget (during the regular three-year training stage) who also benefitted/ benefit from other sources of funding for a period of at least six months is 4.

The estimated percentage is estimated to be 80.00%, which is above the required limit of 20%.

There are no specific recommendations.

***The indicator is fulfilled.***

***Performance Indicator \*A.1.3.3.<sup>2</sup>*** *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*

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<sup>2</sup> 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.



(attending conferences, summer schools, training, programs abroad, publication of specialty papers or other specific forms of dissemination etc.).

It has been found that the overall percentage calculated for SDI, considering the entire reporting period (2016-2020), is 9.79%, slightly below the minimum limit of 10% imposed by the analysed criterion. However, there is variability in the share of the professional training expenses during the 5 years considered, with a significant increase starting with 2017. In fact, for the years 2017-2019 the share of the professional training expenses for the doctoral students varied between 10.48 and 14.01%, above the limit of 10%. In 2020, the share of these expenditures decreased to 9.71%, a value slightly below the 10% threshold, but this fact is correlated with the health crisis situation in the global pandemic context created by the SARS-COV 2 virus infection, under which circumstances the previously planned external mobilities could not be achieved. The decrease in the external mobility expenditure component is only conjectural.

The estimated percentage is estimated to be 9.79%, which is below the required limit of 10%.

Recommendations: As the impact of SARS-COV 2 shock on research declines, participation in international conferences and summer schools abroad should be increased.

***The indicator is partially fulfilled.***

## **Criterion A.2. Research infrastructure**

The research infrastructure is aligned with doctoral studies' research lines and allows students to carry out the required experiments for the validation of their research works.

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

The research infrastructure is aligned with doctoral studies' research lines and allows students to carry out the required experiments for the validation of their research works.

***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 research activity of the doctoral students in Systems Engineering is carried out in the Research Center C09 - Systems for Process Control (SPC), Laboratory L06, belonging to the Department of Automation and Information Technology (AIT), within the Institute of Research and Development of UniTBv (ICDT), as well as in some specialized laboratories of Dept. AIT.

The spaces in which are carried out the research activities and the apparatus, laboratory equipment, experimental platforms, computers, and basic and specific software are adequate for doctoral studies in the field of CIT, allowing research activities in accordance with the assumed mission and objectives.

There are no specific recommendations.

***The indicator is fulfilled.***

## **Criterion A.3. Quality of Human Resources**

*\*general description of the criterion analysis.*



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

At the level of each doctoral field there is enough qualified staff to ensure a quality educational process.

**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 supervisors from the three active supervisors that belongs to the doctoral field of Systems Engineering fully meet the current CNATDCU minimum standards. At least 50% therefore, the indicator is accomplished.

There are no specific 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.*

All from the three Doctoral supervisors are employed full time within the “Transilvania” University of Brasov (UTBV), based on a permanent employment contract.

There are no specific 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 academic subjects from the training programme, which rely on advanced academic studies in Systems Engineering are taught by teachers who are qualified PhD supervisors, professor or associate professor, with proven expertise in the domain of the taught academic subjects

There are no specific 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 programs<sup>3</sup> does not exceed 20%.*

During the reporting period, the doctoral supervisors from the SE field did not have more than 7 doctoral students under coordination at the same time (Anexa A.3.1.4-1).

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<sup>3</sup> 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.





At the time of elaborating the internal evaluation report, the 3 doctoral supervisors in the analyzed field have in coordination 1, respectively 2 doctoral students.

There are no specific 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 scientific production of the three supervisors is considered to be adequate and over the required the minimal CNATDCU standards.

**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.*

PhD supervisor (i.e. 33 of the total number of PhD supervisors who are active in the doctoral field) achieved both subcomponents of the indicator (see Anexa A.3.2.1-3); the other 2 PhD supervisors (i.e. 66% of the total number of PhD supervisors who are active in the doctoral field) achieved the first subcomponent of the indicator.

There are no specific 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.*

The three supervisors achieved in the last 5 years more than 25% of the score required by the CNATDCU minimum standards.

There are no specific recommendations.

**The indicator is fulfilled.**

## **Domain B. EDUCATIONAL EFFECTIVENESS**

*\*general description of domain analysis.*

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

*\*general description of the criterion analysis.*



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

The institution that organizes the doctoral studies don't have any candidates outside their university.

***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.*

At Interdisciplinary Doctoral School level, there are centralized data allowing the analysis of this coefficient for the past 5 doctoral studies entrance examination sessions, more specifically the September 2020, 2019, 2018, 2017 and 2016 entrance examination sessions (Anexa B.1.1.1-1). The calculated values for ratio 1 (the number of candidates from other universities / the number of state budget places) at IOSUD (SDI) level is: 0,33 (2020), 0,47 (2019), 0,38 (2018), 0,38 (2017) and 0,71 (2016). The mean value for the last 5 years for the IDS is 0,45, hence twice the mandatory minimum.

The calculated value for ratio 2 (total number of candidates / the number of state budget places) at IOSUD (SDI) level is 1,61, above the minimum imposed value of 1,2, demonstrating the capacity of attracting a larger number of candidates than the number of state budget seats.

The Systems Engineering Doctoral School don't have any candidates outside their university and for the second criteria the ratio is 1. below the required limit 1.2.

There are no specific recommendations.

***The indicator is partially fulfilled.***

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

The admission to the doctoral study program is clearly defined by the Doctoral School Regulations. Each applicant is individually evaluated attending to its profiles, previous studies and average grades, publications, awards and motivation and scientific interest. A personal interview is also conducted as part of the selection process. However, admission procedures should be visible at the doctoral school website, also in English. The procedures are adequately implemented and help to reduce the dropout rate below the required limit.

***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 competition for doctoral studies takes place as a specialized exam with one or more tests (written or oral) specific to the doctoral field; among them, an interview with the candidate is compulsory (Art. 22). The theme/s put up for competition at the doctoral supervisors' proposal are endorsed by the SDI Council with the consultation of the doctoral field coordinators. The number and type of competition tests for each doctoral field are approved by the SDI Council at the doctoral field



coordinators' proposal, considering their specificity. Information on the competition themes and on the conduct of the competition is published on the website, with a view to informing the candidates (<https://www.unitbv.ro/cercetare/doctorat-postdoctorat-siabilitare/admitere/tematica-admitere.html>).

At the specialized examination, each member of the competition committee assesses the candidate's level of knowledge with grades from 1 to 10 (based on the consultation of the specialized literature) of the relevant issues for that specialization, as well as the candidate's level of knowledge of recent research related to the theme of the doctoral thesis. The interview also aims to assess the candidate's ability to take theoretical, experimental and methodological initiatives on the proposed research (Art. 23), as well as his/her previous experience in research.

There are no specific 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 admission<sup>4</sup> does not exceed 30%.*

The global dropout rate for the reported period (admission sessions from 2013-2017) is 24.30%, below the 30% limit.

There are no specific recommendations.

***The indicator is fulfilled.***

## **Criterion B.2. The content of doctoral programs**

The training program is adequate and includes the compulsory subject about Ethics and academic integrity and Methodology of Scientific Research.

*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.*

The training program is adequate and includes the compulsory subject about Ethics and academic integrity.

***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 Advanced University Training Programme for Systems Engineering doctoral domain is based on a curriculum that contains disciplines intended for the acquiring competences in scientific research: Management and resources in research projects and Dissemination of research results, as well as disciplines intended for the in-depth study of the research methodology and statistical data processing: Statistics in research / Acquisition and processing of experimental data (Anexa B.2.1.1-1 and Anexa B.2.1.1-2).

There are no specific recommendations.

***The indicator is fulfilled.***

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<sup>4</sup> 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 curriculum of the training program for the first year of doctoral studies for SE doctoral domain contains two disciplines dedicated to ethics in scientific research and intellectual property: Ethics and academic integrity and Intellectual property (Anexa B.2.1.1-2).

There are no specific 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 activities<sup>5</sup>.*

The training program based on advanced university studies comprises two distinct modules, intended for the formation of transversal competences useful in successfully completing the doctoral program in the CIT doctoral field (PPUA module 1), respectively for acquiring knowledge and training specialized skills in direct correlation with the doctoral / research topic, approached by each doctoral student within the doctoral field (PPUA module 2). The PPUA 1 module is oriented towards learning outcomes, each discipline in the Curriculum (Anexa B.2.1.1-1) aiming at the formation of competencies clearly specified in the discipline syllabus and followed throughout the course of PhD students within that discipline. Verification forms for PPUA 1 subjects are designed to assess learning outcomes and to contribute themselves to the training of targeted competencies and the acquisition of an appropriate degree of independence / autonomy of PhD students in the creative / applied use of knowledge, conclusion formulation, foreshadowing applicability in approaching one's own research topics and assuming responsibly, in the spirit of the principles of ethics and academic integrity, the implicit research approach.

There are no specific 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.*

Throughout the doctoral training stage, the doctoral students in the field of SE benefited from the counseling / guidance of some functional guidance commissions (Anexa B.2.1.4-1). In addition to the official meetings (on the occasion of the specialized subject examinations in the advanced university training program - year I, of the planned research reports) there were also regular or occasional meetings requested by both parties, as well as electronic correspondence for changes of information in the specific topic of each doctoral thesis.

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<sup>5</sup> 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.



There is a procedure for regular activity monitoring the doctoral students, which consists in drawing up a quarterly activity report and in supporting it in front of the guiding commission (Anexa B.2.1.4-4). There are no specific 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.

Currently, 5 students are enrolled in the field of Systems Engineering. The teaching staff includes 3 Doctoral supervisors in the field of Systems Engineering and 4 other teaching staff. Therefore, the ratio is 5:7, below the required limit 3:1.

There are no specific recommendations.

***The indicator is fulfilled.***

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

Productivity of doctoral students that finished their PhD over the last 5 years is adequate, with many publications although it is suggested to target more journals with impact factor.

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

Provided documentation proves that there are joint publications in journals and conferences between students and supervisors, and they are related to the topic of the doctoral field. However, it is recommended to target journals with impact factors.

***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.

At least 3 of the selected articles present original significant contributions for the domain.

In the last 5 years, within the doctoral field Systems Engineering have been completed and defended a number of 5 doctoral theses (Anexa B.3.1.1).

As a recommendation, publications should target journals with impact factor.

***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.

22 presentations at international conferences were delivered by 5 graduates in Systems Engineering, resulting in a ratio of 4.40.

There are no specific 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.*

The doctoral school keeps contact with other national research groups that regularly participates in the public defense of doctoral theses. Additionally, they are distributed over the defended doctoral thesis so that the requirements are met.

***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.*

Anexa B.3.2.1-1 presents the situation of the scientific references in the review commissions for the publicly defend of the doctoral theses in the field of SE at UniTBv, in the evaluated interval. It results that the number of doctoral theses allocated to a certain referent coming from a higher education institution another than IOSUDUniTBv, does not exceed two, in a year, for the theses coordinated by the same supervisor.

There are no specific 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.*

The number of doctoral theses defended in the field of study is 5 in the last 5 years. As this value is lower than 10, the indicator is accomplished.

There are no specific recommendations.

***The indicator is fulfilled.***

## ***Domain C. QUALITY MANAGEMENT***

The Quality Assurance System is designed and implemented satisfactorily.

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

The Quality Assurance System is designed and implemented. There are procedures to monitor the activity of all the actors of the doctoral domain and to collect feedback information.

*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.*

There is a defined framework for Quality Assurance, with procedures that have been implemented. The framework includes procedures for collecting information about students and advisors, the training program and the infrastructure.

***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.

For the purpose of internal evaluation and monitoring the evolution of the Interdisciplinary Doctoral School (SDI) and of the doctoral fields operating within SDI, the following methodologies were developed and implemented (covering the criteria / aspects mentioned in this indicator - the doctoral supervisors' scientific activity, the infrastructure and logistics necessary to carry out the research activity, the procedures and the subsequent rules for the organization of doctoral studies):

- Methodology on the internal evaluation of the Interdisciplinary Doctoral School within IOSUD-UniTbv (made and applied in 2016);
- Methodology for periodic internal evaluation of the doctoral supervisors' activity (made and applied in 2018).

There are no specific 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.*

The results of the consultation and the concrete proposals of the doctoral students and doctoral supervisors underlay the decisions on certain adjustments in the curricula. The 2018 consultation led to the reconfiguration of curricula and the content of some disciplines for the fields of Engineering and Marketing, implemented in 2018-2019. Thus, the course Statistics in research was differentiated for the fields Engineering sciences and Marketing, while for the engineering fields were configured two packages of elective courses: Creativity and inventics / Intellectual property and Statistics in research / Acquisition and processing of experimental data . The proofs of these measures implemented at the level of IOSUD / Doctoral School following the motivated resolutions of the Council of SDI, validated by CSUD, are presented in the IOSUD report, while their implementation clearly results from the curricula in force.

The results of the 2021 consultation analysed at the level of the doctoral field will be forwarded to the SDI Council to identify the necessary measures for the continuous improvement of the academic and administrative processes..

There are no specific recommendations.

**The indicator is fulfilled.**

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

All the relevant information regarding the doctoral field is available through the website. However, it is recommended to unify all the information under the same domain to provide all the information in



English. Students have access to the electronic resources relevant for the doctoral field and all the research facilities.

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

The links for the doctoral school regulations, admission regulations, doctoral studies contract, information for public defence of the thesis and required standards, the content of training programs, the academic and scientific profile of supervisors, list of PhD students and links to abstracts of doctoral theses to be defended publicly are provided and they contain the expected information.

**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.*

The links for the doctoral school regulations, admission regulations, doctoral studies contract, information for public defence of the thesis and required standards, the content of training programs, the academic and scientific profile of supervisors, list of PhD students and links to abstracts of doctoral theses to be defended publicly are provided and they contain the expected information.

There are no specific 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.*

Students have access to the electronic resources through international databases and the "Transilvania" University of Brasov (UTBV) library, to anti-plagiarism software and labs and equipments required for their research.

**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 Doctoral students and post-graduates from the "Transilvania" University of Brasov (UTBV) have free access to the academic databases relevant in the field of Systems Engineering, such as Science Direct, Springerlink Journals, Web of Knowledge (WoS, Journal Citation Reports), SCOPUS and IEEE/IET Electronic Library. During the meetings with students, the accessibility of electronic resources was confirmed.





There are no specific 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.

For the consolidation of the educational activities at Transilvania University of Braşov, software services were purchased to verify the originality of the studies, through Turnitin software, starting on 1.09.2018 (Anexa C.2.2.2-2) for a period of 4 years, until 31.08.2022 (Appendix A.1.2.2-2).

There are no specific 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 doctoral students have access to scientific research laboratories or other facilities depending on the specifics of the field / fields within the doctoral school, according to internal rules.

During the meetings with students and graduates, it was confirmed the availability of previous facilities.

There are no specific recommendations.

***The indicator is fulfilled.***

### **Criterion C.3. Internationalization**

The doctoral field keeps several ERASMUS agreements with foreign institutions and students have participated in mobilities for attending conferences or courses. Invited lecturers have also participated in the training program.

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

The doctoral field keeps several ERASMUS agreements with foreign institutions and students have participated in mobilities for attending conferences or courses. Invited lecturers have also participated in the training program. In this context, the programme ERASMUS+ (<https://www.unitbv.ro/studenti/erasmus.html>) is a consequential pillar in the internationalization strategy of UniTBv and SDI. Updated inter-institutional agreements are currently active, including the 3rd cycle of doctoral studies, concluded through this programme between Transilvania University of Braşov and 205 universities across EU and associated member states (K103 programme), respectively (third) partner states (programme K107) (Anexa C.3.1.1-1).

***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.



The doctoral field keeps several ERASMUS agreements with foreign institutions and students have participated in mobilities for attending conferences or courses. Invited lecturers have also participated in the training program. At least 40% of doctoral students completed an internship abroad or another form of mobility, such as participating in international scientific conferences..

There are no specific 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.*

In February 2018, the Interdisciplinary Doctoral School, in collaboration with the Faculty of Electrical Engineering and Computer Science, organized the workshop themed on International Publications at ICDT, which was especially intended for doctoral students, having as a guest Prof. Louis François Pau from Copenhagen Business School, Denmark ([https://www.unitbv.ro/images/newsletter/NL\\_Martie\\_2018\\_complet\\_RO.pdf](https://www.unitbv.ro/images/newsletter/NL_Martie_2018_complet_RO.pdf)). The same guest gave a lecture on the topic General Public and Doctoral School Lecture on Energy Saving, intended for the doctoral students in the relevant fields, researchers and teaching staff at UniTBv, and for the specialists in the economic field.

In March 2019, the Interdisciplinary Doctoral School organized at ICDT, in collaboration with the Faculty of Electrical Engineering and Computer Science, the workshop themed on Intellectual Property Rights dedicated to doctoral students, having as a guest Prof. Louis François Pau from Copenhagen Business School, Denmark.

Another international workshop on intellectual property entitled: Introduction to Intellectual Property Protection Law in Europe was organized online in November 2020 by Transilvania University of Braşov / Faculty of Technological Engineering and Industrial Management in cooperation with the European Patent Office (EPO). The event, conducted as an online training, was held by internationally renowned specialists: Jan Demeester, Senior Expert, EPO Benoit Verdonck, Team Manager, EPO, and its organization was mediated through a former doctoral student of IOSUD –UniTBv (Anexa C.3.1.2-1-b).

PhD students from the SE field participated and will participate in the mentioned events.

There are no specific 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.).*

A conclusive example of IOSUD-UniTBv's actions to attract international PhD students is the Transilvania Academica Scholarship (TAS programme.) (<https://tas.unitbv.ro/>) by which up to 15 scholarships from the university's own income are granted every year, based on a competition, to the best performing international students from non-EU or EEA member countries. The programme, unique in the country, was launched in 2017; currently, 7 doctoral students benefiting from TAS scholarships or assimilated TAS, are in their training stage. TAS assimilated scholarships are granted by Decision of the Executive Board of UniTBv to graduates of higher education institutions from third countries, with which



collaboration agreements have been concluded, or to other candidates identified by the Romanian Consular Missions in third countries.

There are no specific recommendations.

***The indicator is fulfilled.***

#### IV. SWOT Analysis

<p><b><u>Strengths:</u></b></p> <ul style="list-style-type: none"> <li>- Supervisors show an adequate scientific production</li> <li>- The Quality Assurance Systems and Information system have been successfully implemented.</li> <li>- Fluid relationships between students and supervisors.</li> </ul>	<p><b><u>Weaknesses:</u></b></p> <ul style="list-style-type: none"> <li>- The small number of theses written in international co-supervision;</li> <li>- The low level of strong internationalization for the time being</li> <li>- A low number of full-time PhD supervisors within IOSUD-UniTBv.</li> </ul>
<p><b><u>Opportunities:</u></b></p> <ul style="list-style-type: none"> <li>- Strengthening the collaboration with the socio-economic environment and developing the system for calibrating doctoral research topics in accordance with the development needs of companies;</li> <li>- The existence of a fruitful collaboration in the SE domain with relevant international universities;</li> <li>- The national and European research strategy requires the training of highly qualified specialists / doctors in the SE domain, who will respond to the needs of the labour market;</li> <li>- Attracting doctoral students from abroad, mainly from EU third countries, based on the collaborative relations of UniTBv with such institutions.</li> </ul>	<p><b><u>Threats:</u></b></p> <ul style="list-style-type: none"> <li>- Decrease in the capacity to attract doctoral students, due to the reduction in the number of tenured PhD supervisors (especially through retirement);</li> <li>- National and international competition in the field of doctoral studies to attract doctoral students and financial resources;</li> <li>- Migration of Romanian university graduates to institutions abroad or to the labour market in other countries;</li> <li>- Lack of attractiveness of the existing doctoral research scholarships / grants;</li> <li>- Lower availability of companies for investments in the training of highly qualified specialists and for doctoral research.</li> </ul>

#### V. Overview of judgments awarded and of the recommendations

No.	Type of indicator (*, C)	Performance indicator	Judgment	Recommendations
1		A.1.1.1	Fulfilled	
2		A.1.1.2	Fulfilled	
3		A.1.2.1	Fulfilled	
4		A.1.2.2	Fulfilled	

5		A.1.3.1	Fulfilled	
6	*	A.1.3.2	Fulfilled	
7	*	A.1.3.3	Partially Fulfilled	As the impact of SARS-COV 2 shock on research declines, participation in international conferences and summer schools abroad should be increased.
8	C	A.2.1.1	Fulfilled	
9	C	A.3.1.1	Fulfilled	
10	*	A.3.1.2	Fulfilled	
11		A.3.1.3	Fulfilled	
12	*	A.3.1.4	Fulfilled	
13	C	A.3.2.1	Fulfilled	
14	*	A.3.2.2	Fulfilled	
15	*	B.1.1.1	Partially fulfilled	The Systems Engineering Doctoral School don't have any candidates outside their university and for the second criteria the ratio is 1. below the required limit 1.2.
16	*	B.1.2.1	Fulfilled	
17		B.1.2.2	Fulfilled	
18		B.2.1.1	Fulfilled	
19		B.2.1.2	Fulfilled	
20		B.2.1.3	Fulfilled	
21		B.2.1.4	Fulfilled	
22	C	B.2.1.5	Fulfilled	
23	C	B.3.1.1	Fulfilled	
24	*	B.3.1.2	Fulfilled	
25	*	B.3.2.1	Fulfilled	
26	*	B.3.2.2	Fulfilled	
27		C.1.1.1	Fulfilled	
28	*	C.1.1.2	Fulfilled	
29	C	C.2.1.1	Fulfilled	
30		C.2.2.1	Fulfilled	
31		C.2.2.2	Fulfilled	
32		C.2.2.3	Fulfilled	
33	*	C.3.1.1	Fulfilled	
34		C.3.1.2	Fulfilled	
35		C.3.1.3	Fulfilled	

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

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



## VI. Conclusions and general recommendations

The present periodic external evaluation report was conducted for the evaluation of the Doctoral Studies Area Systems Engineering (SE), Doctoral School (DS), IOSUD UniTBv.

From the analysis carried out on the Internal Evaluation Report, following the meetings held at all levels, as well as from the on-site visit to inspect the teaching and research infrastructure, it emerged that overall the Systems Engineering doctoral degree area has a clear and well-defined mission, well thought-out objectives and programmes, successfully responding to growing market needs, being an interdisciplinary doctoral programme providing highly qualified specialists for research-development-innovation and educational work in higher education institutions, research institutes and R&D departments of companies in the field.

Doctoral students have access to a properly dimensioned research infrastructure of the Doctoral School, benefiting also from a university library with extensive bibliographical resources, including online, as well as the support of a modern research infrastructure.

All quality indicators related to the standards and evaluation criteria are met, except for one indicator which is partially met, and only specific recommendation is proposed for further improvement of the participation in international conferences and summer schools abroad should be increased after the impact of SARS-COV 2 shock on research declines.

I am satisfied with the overall doctoral training programme. The faculty has designed and implemented an interested PhD program in the field of Computing and Information Technology. Research results have been published both at international conferences and international journals.

*Budapest, 2021. december 01.*

*International Evaluator*

*Dr. habil. Gabor Kiss PhD.*