ROMANIAN AGENCY FOR QUALITY ASSURANCE IN HIGHER EDUCATION
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Annex No. 3

The External Evaluation Report of a Doctoral Study Domain

Contents

I. Introduction[1]

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.).

University of Oradea (UO) organizes doctoral studies within the Institution Organizing Doctoral Studies – University of Oradea (IOSUD-UO).

This periodic external evaluation report was carried out for the evaluation of the Electronic Engineering, Telecommunications and Information Technologies (IETTI) doctoral programme of IOSUD University of Oradea(UO).

Type of evaluation: periodic external evaluation
Evaluation visit period: 15 November - 22 November 2021.
Composition of the expert evaluation committee:
1. Prof. Oltean Gabriel - Expert evaluator RNE, Universitatea Tehnică Cluj-Napoca, Romania
2. Prof. univ. dr. eng. Gabor Kiss - international expert, Obuda University, Budapest, Hungary
3. Neluțu-Cosmin Rus - student doctorand, Universitatea din Petroșani, 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.

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

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.

I.O.S.U.D.-The University of Oradea is a higher education institution accredited to organize doctoral studies in 18 doctoral fields, organized in 7 doctoral schools, both in the form of full-time education and in the part-time form. The doctoral university study programs operate in accordance with the national legislation and meet the quality criteria imposed by the national regulations. Details regarding the organization of doctoral university studies can be viewed by accessing the page https://doctorat.uoradea.ro/ro/, and the related statistical situations are presented in this Annual Report of the director of the C.S.U.D., for the year 2020.

Currently, within the University of Oradea there are 7 Doctoral Schools within the structure of the faculties.

The activity within the I.O.S.U.D.-University of Oradea is coordinated by the Council of Doctoral Studies (C.S.U.D.), which is led by a Director. Doctoral schools are structures similar to the departments being set up within the faculties that manage the doctoral fields. The structure that coordinates the activity of the Doctoral Schools is the Doctoral School Council (CSD), led by a director. The secretarial activity is carried out within the Secretariat of Doctoral University Studies (SSUD) composed of a chief secretary and secretary. The activity within the Doctoral Schools is carried out in accordance with the provisions of the national legislation and of the internal regulations.

The ENGINEERING SCIENCES DOCTORAL SCHOOL (SD) operates under this name starting with the academic year 2011-2012 (SD no. 170 of 12.09.2011-Annex 11, according to ROFSUD, art.6, paragraph (3) - ROFSUD, art.7, alin (2)), with doctoral studies in the fundamental fields of Engineering Science and Mathematics and Natural Sciences, doctoral fields Agronomy, Electrical Engineering, Electronics Engineering, Telecommunications and Informational Technologies, Energy Engineering, Industrial Engineering, Engineering and Management and Mathematics.

The PhD field of Electronic Engineering, Telecommunications and Information Technologies has been operating at IOSUD UO since 2019 (Annex III.A.1).

Currently, the doctoral field of Electronic Engineering, Telecommunications and Information Technologies (IETTI) has 2 supervisors and 4 PhD students. It has to be mentioned that prof.dr.ing.habil. Alexandru Gacsàdi deceased in 2020, at only 59 years old, and presently conf.dr.ing. Ioan Buciu and prof.dr.ing. Daniel Trip are writing their habilitation thesis to can supervise PhD thesis in the field of "Electronics Engineering, Telecommunications and Informational Technologies".

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 two indicator that is partially fulfilled: A1.3.3. and A.3.1.1

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

According to the financial situation received from the University of Oradea, 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.

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 Oradea 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 software, recognized by the National Council for Attesting the University Titles, Diplomas and Certificates (CNATDCU).

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.

Between 2016-2020, within the Electronic Engineering, Telecommunications and Information Technologies doctoral field, 5 research grants, 0 institutional development grants and 1 human resources grants were developed/are in progress. 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 the field of doctoral studies "Electronics Engineering, Telecommunications and Informational Technologies" are found at the time of preparation of the Internal Evaluation Report a total number of 4 doctoral students. The number of doctoral students who have benefited / benefit from other sources of funding, for a period of at least six months, is 1 student, representing 25%.

There are no specific recommendations.

The indicator is fulfilled.

*Performance Indicator *A.1.3.3.[2] At least 10% of the total amount of doctoral grants obtained by the university through institutional contracts and of tuition fees collected from the doctoral students enrolled*

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

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.).

Taking into account the whole reporting period, the calculated overall percentage is 4.20%, below the 10% minimum threshold set by the analysed criterion. In the years 2020 and 2021, the share of professional training expenditure for doctoral students are 4.16% and 4.30%, which are above the 10% threshold.

The estimated percentage is estimated to be 4.20%, 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.

At the level of the Faculty of Managerial and Technological Engineering and Faculty of Electrical Engineering and Information Technology, which manages the doctoral field "Electronics Engineering, Telecommunications and Informational Technologies", there are 2 internally certified research centers. Its members are doctoral coordinators, teaching staff, members of the steering committees and doctoral students.

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 time of the evaluation, there were less than 3 doctoral supervisors to meet the CNATDCU criteria. It has to be mentioned that prof.dr.ing.habil. Alexandru Gacsàdi deceased in 2020, at only 59 years old.

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.

The two active supervisors that belongs to the doctoral field of Electronic Engineering, Telecommunications and Information Technologies do not meet the current CNATDCU minimum standards. It should be mentioned that prof.dr.ing. Alexandru Gacsàdi died in 2020, so at the moment in the doctoral field IETTI carries out only two doctoral supervisors, this situation cannot be anticipated.

There are no specific recommendations.

The indicator is partially 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.

One from the 2 Doctoral supervisors are employed full time within the University of Oradea(UO), based on a permanent employment contract which means a percentage of 50%.

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 the field, are taught by members of the teaching staff or by researchers who are qualified PhD supervisors/habilitated, either Professor/CS I, Associate Professor/ CS II with proven expertise in the domain of the academic subjects that they teach or other specialists in the field who meet the standards set by the institution for the above mentioned teaching and research positions, according to the provisions of the law.

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[3] does not exceed 20%.

At the time of elaboration of the self-evaluation report, within the doctoral field Electronic Engineering, Telecommunications and Information Technologies, a number of 2 doctoral supervisors work, none of them coordinating more than 8 students at the same time.

There are no specific recommendations.

The indicator is fulfilled.

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[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.

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 two 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.*

At least 50% of the PhD supervisors from the evaluated domain have a minimum of 5 Web of Science or ERIH indexed publications in journals with impact factor or other achievements with relevant significance for the respective domain.

The list of publications of each supervisor is included in the supplementary documentation and demonstrates that the scientific production and the quality of journal is clearly above the requirements of the indicator (Annex II.A.29).

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 two supervisors achieved in the last 5 years more than 25% of the score required by the CNATDCU minimum standards (Annex II.A.28).

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.

Within IOSUD - UO in all doctoral fields the number of candidates is much higher than the number of doctoral grants allocated by the Ministry of Education.

The doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" is a new field that started at UO in 2019.

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.

The calculated values it the report shows the number of master's degree graduates of other higher education institutions in the country or abroad who have registered for the admission competition for doctoral studies and the number of places financed from the state budget put up for competition at the admissions 2015- 2019 for the evaluated doctoral field is 1/1 (in 2019 2 candidates, both 2 were admitted, one with fee). The report between the candidates in the last 5 years and the number of places financed from the state budget in the field of "Electronics Engineering, Telecommunications and Informational Technologies" is 2/1 and higher the required minimum.

There are no specific recommendations.

The indicator is 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 competition for admission to doctoral studies takes the form of a specialised examination, with one or more tests (written or oral) specific to the doctoral field, including a compulsory interview (Article 22). On the proposal of the doctoral supervisors, the topics for the competition are approved by the Council of the SDI in consultation with the coordinators of the doctoral fields. The number and type of competitions for each doctoral field shall be approved by the Council of the SDI on the basis of proposals from the coordinators of the doctoral fields, taking into account their specificities.

In the specialised examination, each member of the competition committee will assess the candidate's level of knowledge of the issues relevant to the field in question and his/her knowledge of the latest research on the subject of the doctoral thesis, with marks from 1 to 10 (based on a review of the literature). The interview is also designed to assess the candidate's ability to take theoretical, experimental and methodological initiatives in relation to the proposed research and his/her previous research experience.

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[4] does not exceed 30%.

The average dropout rates for the four years considered are 0%, 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 advanced university training program includes disciplines of scientific research methodology and ethics and academic integrity, but also relevant disciplines for training in scientific research in the evaluated doctoral field. Starting with the academic year 2018-2019, the Curriculum (Annex II.B.1) was revised and updated in accordance with OMEN 3131 / 30.01 .2018, respectively HS nr.32/19.02.2018-Annex 13, introducing as a separate discipline Ethics and academic integrity in the field of Engineering Sciences.

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.

Following the attendance of the activities enrolled in the Training and Results Program, the doctoral students are obliged to obtain a number of 30 credits. The disciplines within the PUA run for three months / first year. The details of the activities (course, seminar, number of credits, etc.) are provided in the Discipline Sheets, specifying the objectives of the disciplines, the basic thematic content, the evaluation system of doctoral students and the minimum bibliography. The activities within the PUA are provided in a schedule made public at the beginning of the school year.

The curriculum includes at least two components dedicated to some of the transversal competences, including aspects related to research ethics, scientometry and academic writing.

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[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.

The files of the disciplines provided in the curriculum are presented in Anexa II.B.2.

The advanced university training program includes relevant disciplines for training in scientific research in the doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" namely: Telecommunications Networks, Specials Issues of Electronics, Non-stationary signal analysis and synthesis, Audio-video signal analysis and synthesis, Applications of cellular neural networks, Video equipment, Digital transmission systems on optical fibres or Security of telecommunications networks and services (Anexa II.B.2).

There are no specific recommendations.

The indicator is fulfilled.

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

In the evaluated doctoral field, there is the discipline Ethics and academic integrity in the field of Engineering Sciences provided in the curriculum of the doctoral field (Anexa II.B.1).

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[5].

The curriculum for the doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" has formulated the competencies that are to be ensured through the curriculum. They are divided into professional and transversal skills. The subject sheets for the compulsory subjects in the plan corresponding to the training program based on advanced university studies are presented in Annex II.B.2.

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.

Each doctoral student is guided, in addition to the scientific supervisor (who has a schedule of activities and consultations made public at the doctoral school Annex II.B.3), by a steering committee consisting of 3 other teaching staff, having at least the title of doctoral lecturer, specialists in the field of doctorate and thesis topic. The guiding commissions for doctoral students enrolled within the Doctoral School of Engineering Sciences/doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" are presented in Annex II.B.4.

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

The activity of the PhD supervisors and of the members of the guiding commissions is normed in the State of functions of the doctoral school or in the states of functions of the university departments where the holders have the basic norm.

For the field of evaluated doctoral university studies, a percentage of 50% of the doctoral students who defended their doctorate or who completed their doctoral training period in the period subject to evaluation were selected for example = is not the case of this evaluated field which is a new one, starting only in 2019.

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, 4 students are enrolled in the field of Electronic Engineering, Telecommunications and Information Technologies. The teaching staff includes 2 Doctoral supervisors in the field of Electronic Engineering, Telecommunications and Information Technologies and 2 other teaching staff. Therefore, the ratio is 4:4, 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 not applicable because the doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" which is a new one, starting only in 2019, no PhD students defended their PhD thesis yet.

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.*

For the doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" which is a new one, starting only in 2019, no PhD students defended their PhD thesis yet. Each PhD student submitted at least one article at the international conference ICEMES'2021.

There are no specific recommendations.

The indicator is not applicable.

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.*

During the evaluation period, in the doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" which is a new one, starting only in 2019, no PhD students defended their PhD thesis yet, but they will participate to the international conference ICEMES'2021, each PhD student submitting at least one article.

There are no specific recommendations.

The indicator is not applicable.

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 indicator is not applicable in this case, because the doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" is a new one, starting only in 2019 and therefore no PhD students defended their PhD thesis yet.

There are no specific recommendations.

The indicator is not applicable.

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 indicator is not applicable in this case, because the doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" is a new one, starting only in 2019 and therefore no PhD students defended their PhD thesis yet.

There are no specific recommendations.

The indicator is not applicable.

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)

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.

Procedures for collecting information about the students' level of satisfaction have been implemented. The results of the "Satisfaction Report of PhD students from the Doctoral School of Engineering Sciences" for 2020 are presented in Annex II.C.9. These results are analyzed within the CSD, and the CSD will draw conclusions and, if necessary, will propose a package of measures to improve the doctoral program as a whole, respectively in order to continuously improve the academic and administrative services provided.

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 reseach facilities.

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

All the information regarding the completion of the doctoral program, starting with the admission and until obtaining the doctoral degree, are provided to the doctoral students both through the IOSUD

secretariat department and by posting on the site, the related forms can be found at (https://doctorat.uoradea.ro/ro/documente/formulare-utile).

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.

IOSUD –UO has and has had for the entire assessed duration of access to the services offered through the ANELIS Plus program (Annex II.C.13 - ANELIS Plus Contracts), in order to offer doctoral students free access to a platform with relevant academic databases for the fields of organized 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 Doctoral students and post-graduates from the University of Oradea(UO) have free access to the academic databases relevant in the field of Electronic Engineering, Telecommunications and Information Technologies, such as ROQUEST Central, ScienceDirect Freedom Collection, Scopus, Elsevier, de Gruyter ebooks, SpringerLink Journals, Springer, Web of Science - Core Collection, InCites Journal Citation Reports, Derwent Innovations Index, Clarivate Analytics.

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 prevention and control of plagiarism-related fraud at the level of IOSUD - University of Oradea, all doctoral and habilitation theses are verified by an anti-plagiarism software, which is in the list of programs recognized by CNATDCU and used at the level of higher education institutions organizing studies doctoral university and of the Romanian Academy, in order to establish the degree of similarity for scientific papers, in accordance with MENCS Order no. 3485 / 24.03.2016. (Annex II.A.19 - Evidence of purchase of anti-plagiarism software), respectively (Annex II.A.19 - SD approval-anti-plagiarism verification).

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 PhD field "Electronics Engineering, Telecommunications and Informational Technologies" being a new one, established in 2019). There is an extensive list of Erasmus Plus agreements at university level, most of which address undergraduate and master's degree levels.

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

There is an extensive list of Erasmus Plus agreements at university level, most of which address undergraduate and master's degree levels.

The situation is identical in the field of doctoral studies IETTI, where there is a framework agreement for the mobility of doctoral students and teachers with INSA - Lyon, France, which provides 5 mobilities. The PhD students participated in international seminars (offered by Pazmany Peter Catholic University in Budapest) and in an international conference. There is openness and support for the realization of doctorates in international co-supervision.

IOSUD The University of Oradea participated, during the period evaluated by its representatives, in 7 international educational fairs abroad to attract international doctoral students.

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.*

At the level of the doctoral field of Electronic Engineering, Telecommunications and Information Technologies there is a framework agreement for the mobility of doctoral students and teachers with INSA - Lyon, Brother (Annex II.A.4), which provides 5 mobilities. At the university level there are several mobility agreements (Annexes II.C.20)

A number of 3 PhD students in the field of IETTI doctoral studies (Cret Gabriel Catalin - 2 articles; Marcu David - 1 article; Cuc Adriana - 1 article) participated in the 16th International Conference on Engineering of Modern Electric Systems - ICEMES'2021 (http://www.icemes.uoradea.ro/icemes2021/). The PhD students participated to the conference, according with the conference program and the presented papers being indexed by IEEEXplore and ISI.

The doctoral students also participated online in international seminars, offered by the Pazmany Peter Catholic University in Budapest, a partner university, with which the University of Oradea has very good collaboration relations. The program of these seminars is presented in Annex III.A.5.

At least 35% of PhD students attended an international scientific conference.

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.*

PhD students have the opportunity to benefit (in addition to the Erasmus + mobility agreements mentioned in the internal evaluation report) from collaboration relations between the University of Oradea and other partner universities abroad, such as the National Institute of Applied Sciences from Lyon, France (https://www.insa-lyon.fr/)

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.).*

PhD students in the field participated in international seminars, offered by the Pazmany Peter Catholic University in Budapest, a partner university, with which the University of Oradea has very good collaboration relations (Annex III.A.5.)

During the IOSUD evaluated period, the University of Oradea participated through its legal representatives in 7 international educational fairs (Spain, Japan, Switzerland, USA, Finland, Hanoi, Turkey) for attracting international doctoral students (according to the table with participation in international education fairs presented in IER). So far there are no international experts in the commissions for guidance.

There are no specific recommendations.

The indicator is fulfilled.

IV. SWOT Analysis

	Strengths:	Weaknesses:
	- Supervisors show an adequate scientific production - The Quality Assurance Systems and Information system have been successfully implemented. - Fluid relationships between students and supervisors.	- The small number of theses written in international co-supervision; - The low level of strong internationalization for the time being - A low number of full-time PhD supervisors within IOSUD-UO.
	Opportunities:	Threats:
	- 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; - Strengthening the collaboration in the IETTI domain with relevant international universities; - The national and European research strategy requires the training of highly qualified specialists / doctors in the IETTI domain, who will respond to the needs of the labour market;	- The number doctoral supervisors and teaching staff is still small and should be increased to facilitate the admission of a higher number of students; - Lower availability of companies for investments in the training of highly qualified specialists and for doctoral research.

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	Taking into account the whole reporting period, the calculated overall percentage is 4.20%, below the 10% minimum threshold set by the analysed criterion.
8	C	A.2.1.1	Fulfilled	
9	C	A.3.1.1	Partially Fulfilled	The two active supervisors that belongs to the doctoral field of Electronic Engineering, Telecommunications and

				Information Technologies do not meet the current CNATDCU minimum standards.
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	Fulfilled	
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	not applicable	This indicator is not applicable in this case, because the doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" is a new one, starting only in 2019 and therefore no PhD students defended their PhD thesis yet.
24	*	B.3.1.2	not applicable	This indicator is not applicable in this case, because the doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" is a new one, starting only in 2019 and therefore no PhD students defended their PhD thesis yet.
25	*	B.3.2.1	not applicable	This indicator is not applicable in this case, because the doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" is a new one, starting only in 2019 and therefore no PhD students defended their PhD thesis yet.
26	*	B.3.2.2	not applicable	This indicator is not applicable in this case, because the doctoral field of "Electronics Engineering, Telecommunications and Informational Technologies" is a new one, starting only in 2019 and therefore no PhD students defended their PhD thesis yet.
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 Electronic Engineering, Telecommunications and Information Technologies (IETTI), Doctoral School (DS), IOSUD UO.

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 Electronic Engineering, Telecommunications and Information Technologies 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.

The most quality indicators related to the standards and evaluation criteria are met, except for two indicators which are partially met.

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.