

The External Evaluation Report of a Doctoral Study Domain

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I. Introduction¹

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.).

I was assigned with the evaluation of the Doctor Training Program at the Faculty of Mechatronics and Robotics. The evaluation was carried out using Zoom on-line platform. The meeting started on the 5th of July 2021 where ARACIS President provided to the entire team the framework of evaluation. Afterwards, there was meeting with the Rectors and Vice Rectors, the Quality Assurance, the Faculty, the PhD students and the PhD graduates of the University of Craiova.

According to Art. 6 para. 3 of the Institutional Regulation for the organization and functioning of the doctoral study programs within the Doctoral School "CONSTANTIN BELEA" at the Faculty of Mechatronics and Robotics, the members of the Doctoral School Council are elected by universal, direct, secret and equal vote of the Doctoral supervisors from the Doctoral School.

The "CONSTANTIN BELEA" Doctoral School participates, through the affiliated Doctoral supervisors, in the implementation of research or institutional development / human resources grants in the field of Mechatronics and Robotics. After examining the Internal Self-Evaluation Report, the following meeting had been arranged with the Head of the Doctoral Training Program, Professor Dorian Cojocaru who provided very useful information.

The research activities within the doctoral school can be conducted in 3 distinct centres: INCESA, Faculty of Mechanics and Faculty of Automation, Computers and Electronics. The following research labs have been established in the Department: "Computer Aided Engineering and Design", "E-Mechatronics",

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



"Robotics and Flexible Manufacturing Systems", "Management systems and equipment" and "Innovative Techniques and Processes in Mechatronics and Robotics". Additional research support is provided at the INCESA Research Hub of Applied Sciences research hub.

II. Methods used

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

- The analysis of the internal evaluation report of the doctoral study domain under review and its Annexes;
- The analysis of documents made available by the IOSUD, in physical format, during the evaluation visit (if such documents have been requested);
- The analysis of documents, data and information available on the IOSUD/Doctoral School(s) website, in electronic format;
- Visiting the buildings included in the institution's property, comprising (indicative and non-exhaustive list, which shall be changed according to the context):
 - classrooms;
 - laboratories;
 - the institution's library;
 - research centers;
 - the Career Counselling and Guidance Center;
 - lecture halls for students;
 - the student residences;
 - the student cafeteria;
 - sports ground etc.;
- Meeting/discussions with doctoral students in the doctoral study domain under review;
- Meeting/Discussions with the graduates of the doctoral study domain under review;
- Meeting/Discussions with employers of the graduates in the doctoral study domain under review;
- Meeting/Discussions with the school officials of the Doctoral School(s) in which the doctoral study domain under review is operating;
- Meeting/Discussions with the doctoral advisors in the doctoral study domain under review;
- Meeting/discussions with the representatives of the various structures of the IOSUD/Doctoral School(s) in which the doctoral study domain under review is operating:
 - The Council of the Doctoral School, the University Senate, the Board of Directors, the Quality Assessment and Assurance Commission, the Quality Assurance Department, the Ethics Commission (including with the student representatives of these structures);
 - the Career Counselling and Guidance Center;
 - student organizations;
 - secretariats;
 - various departments/administrative offices (Social/Student residences-Cafeterias etc.);
- Application of questionnaires to doctoral students or academic staff in the doctoral study domain under review.



The analysis is based on the Zoom meeting that took place online with different stakeholders from the University and the Faculty. The meeting gave the opportunity to the external committee to liaise with the faculty members of the Doctoral Training Programme, PhD graduates, PhD students and employers. The evaluation report includes basic information regarding historical information about the Faculty, research mission and objectives, quality of the supervision and research outcome. The report is provided in English. However, all the Annexes are provided in Romanian. However, the responsible team for the Self-Evaluation study has provided assistance to understand the structure of the Doctoral school and its mission. More specifically, the following clarifications have been provided by the Faculty:

- Evaluation of the course
- Research infrastructure
- Research Outcome
- Secondments in industry
- Employability opportunities

III. Analysis of ARACIS's performance indicators

Domain A. INSTITUTIONAL CAPACITY

There is evidence where the Faculty applies broadly accepted metrics (e.g. quantity and quality of publications, standard citation indices, internships) on the Doctoral training program. As an effect the Doctoral program is deemed as good. It seems that the relatively longer graduation period and difficulties facing the job-hunting efforts of Doctoral students can be only partly attributed to an overloaded schedule of project engagement, and suboptimum career placement efforts.

The Doctoral School carries out research in the following fields: Advanced Mechatronics Systems, Advanced Robotic Structures and Systems, Advanced Robotics Theory, Sensorial and Actuation Systems in Mechatronics and Robotics, Languages and Software for the Intelligent Home, Sensors and Sensor Networks for the Intelligent Home, Robotic Vision, CAD for Mechatronic Systems and Artificial Intelligence.

The area is very interesting and contribute to the Romanian economy. However, the Faculty has rather limited human resources in terms of academics (PhD Supervisors) to support this broad research field.

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

The University has adopted a holistic approach towards administrative, management and financial planning of different Doctoral training programs.

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 Council of "Constantin Belea" Doctoral School consists of 3 faculty members of the doctoral school which are PhD supervisors, an external member PhD supervisor and a PhD candidate within the doctoral school.

Performance Indicator A.1.1.1. *The existence of specific regulations and their application at the level of the Doctoral School of the respective university doctoral study domain:*

(a) *the internal regulations of the Doctoral School:* The regulation of the Doctoral School is described in Annex A_2.3. The description is in Romanian language.

(b) *the Methodology for conducting elections for the position of director of the Council of doctoral school (CSD), as well as elections by the students of their representative in CSD and the evidence of their conduct.* The methodology for the election is presented in Annex A.1.3.3-A.3.3.6. The description is in Romanian language. There is evidence about the people that have voted to construct the council. After discussing with the faculty members and the PhD students, the whole process seems to be transparent.

(c) *the Methodologies for organizing and conducting doctoral studies (for the admission of doctoral students, for the completion of doctoral studies).* There is a link with a pdf file describing the organisation of the doctoral studies. The description is in Romanian.

(d) *the existence of mechanisms for recognizing the status of a Doctoral advisor and the equivalence of the doctoral degree obtained abroad.* After reading the Self-Evaluation report, there is a clear supervisor assigned to each student. This is also linked to Annex_A.1.1.1.e2 that is in Romanian.

(e) *functional management structures (Council of the doctoral school), giving as well proof of the regularity of meetings;* The Doctoral students will submit to the secretariat of the Doctoral School an application for registration accompanied by a CV, research proposal and a certificate issued by the Doctoral School attesting the status of student, doctoral field, year of enrolment and year of study. This process is provided in detail in Romanian in Annex.

(f) *the contract for doctoral studies;* The contract template is provided in the Annexes.

(g) *internal procedures for the analysis and approval of proposals regarding the training for doctoral study programs based on advanced academic studies.* There is procedure regarding the evaluation of the research proposals from the academics.

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* Evaluation has been carried out remotely after reading the Self-Evaluation report. Further clarification has been requested since Annexes are in Romanian.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* There is good procedure regarding the management of the Doctoral program. There is a need for the Faculty to use a workflow system to support transparency (e.g. meeting of the PhD student with the PhD committee).

Recommendations:

The research area and strategy is too broad for such a small faculty team of academics.

The Department needs to align the research proposals with the research strategy.

The Doctoral programs need to provide training on soft-based skills (e.g. project management, presentation skills, entrepreneurship, patent filing).

The Faculty should make arrangements for candidates with disabilities

There is no process regarding the interaction among the PhD students to work in group-based projects.

There is a need to introduce a process to evaluate PhD progress every year.

It seems that there is no process regarding the replacement of students/academic that leave the University and have been selected as members of the Council.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator A.1.1.2. *The doctoral school' Regulation includes mandatory criteria, procedures and standards binding on the aspects specified in Article 17, paragraph (5) of the Government Decision No. 681/2011 on the approval of the Code of Doctoral Studies with subsequent amendments and additions.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself-* The doctoral study programme within the "Constantin Belea" Doctoral School of the Faculty of Mechantronics and Robotics are organized and operate using National education law no.1/2011, Tthe code of doctoral studies, approved by H.G. 681/2011, with subsequent amendments and completions and MENCS Order No. 3482 of 24.03.2016. This information is described in detail in Romanian in the following Link: https://www.ucv.ro/invatamant/educatie/programe_doctorat/reglementari.php. The information is provided in Romanian.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself-* There is information and description on the Self-Evaluation report regarding the supervisor allocation, decision-making, changing supervisor, interruption conditions and training on research ethos and integrity.

Recommendations:

-A clearer process is required regarding the allocation and even distribution of students to PhD supervisors.

-There is a need to align the research projects with research mission and objectives

-There is a need to utilise the Doctoral Committee to formalize PhD progress on annual basis and decision-making.

- There is a need to establish more systematic collaboration between the Doctoral students and the other researchers within the Faculty.

The indicator is fulfilled/partially fulfilled/not fulfilled.

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

The analysis is mainly based on the Internal Self-Evaluation report that it is provided in English. The Faculty has human and capital resources to support the Doctoral training program.

Performance Indicator A.1.2.1. *The existence and effectiveness of an appropriate IT system to keep track of doctoral students and their academic background.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The University has already deployed a central IT system to administer students in Cycles I, II and III (<https://cis01.central.ucv.ro/evstud/>). Any change in the status of the Doctoral student is recorded in the electronic records at the level of each faculty office within which the Doctoral School operates. The IT system provides statistics and generates tables with graduates of doctoral studies based on which doctoral degrees are issued (see Annexes).



- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself- The Annex A.1.2.–IM provides evidence of the IT system to support Doctoral Program. This Annex is provided in Romanian.

Recommendations:

Use of central system to record meetings between the Supervisor Team and the PhD student

Use of the IT system to support the alumni.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator A.1.2.2. *The existence and use of an appropriate software program and evidence of its use to verify the percentage of similarity in all doctoral theses.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself. The University utilises a specialised software tool, (<https://sistemantiplagiat.ro/>) which, where the text from the thesis is compared with texts from external databases (of other users of the application). The software may indicate similarities between the verified text and the texts with which it was compared.

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself. It seems that a straightforward process has been used to check the similarity in the PhD thesis. However, there was no evidence about the similarity index of theses that have been submitted for evaluation. There is no evidence provided regarding the plagiarism output.

Recommendations:

Use of anonymised samples of PhD theses to train students.

Use the tool to analyse the scientific manuscripts that have been written by the PhD students

Make clear the penalty imposed in case plagiarism detected.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Standard A.1.3. The IOSUD makes sure that financial resources are used optimally, and the revenues obtained from doctoral studies are supplemented through additional funding besides governmental funding.

The Faculty has been using state, project and internships funds to support the Doctoral training program.

Performance Indicator A.1.3.1. *Existence of at least one research or institutional / human resources development grant under implementation at the time of submission of the internal evaluation file, per doctoral study domain under evaluation, or existence of at least 2 research or institutional development / human resources grant for the doctoral study domain, obtained by doctoral thesis advisors operating in the evaluated domain within the past 5 years. The grants address relevant themes for the respective domain and, as a rule, are engaging doctoral students.*



- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself*- The "CONSTANTIN BELEA" Doctoral School participates in the implementation of either research or institutional development / human resources grants in the field of Mechatronics and Robotics. Throughout the reporting period, the Faculty is involved in ongoing 2 grants.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself*- The Faculty is involved in 8 institutional development / human resource projects.

Recommendations:

Link the research strategy and objectives with the research grants

Since the academic team is very small, there is a need to narrow down the research areas and priorities

Liaise with Faculty of Mechanical Engineering to maximise research output

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator *A.1.3.2. *The percentage of doctoral students active at the time of the evaluation, who for at least six months receive additional funding sources besides government funding, through scholarships awarded by individual persons or by legal entities, or who are financially supported through research or institutional / human resources development grants is not less than 20%.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* According to the Self-Evaluation report, a total number of 5 Doctoral students have benefited from state funding and 7 students have benefited from other sources of financing.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The number of students that received beneficiaries is rather small (7). However, such number depends on the small number of PhD supervisors. This number is just well above the 20% threshold.

Recommendations:

Liaise with the industrial and public authorities and stakeholders to further exploit opportunities for the PhD students.

Increase the number of research proposals at both national and international level.

Provide detailed information regarding different PhD projects to demonstrate a coherence to meet research objectives.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator *A.1.3.3.² *At least 10% of the total amount of doctoral grants obtained by the university through institutional contracts and of tuition fees collected from the doctoral students enrolled in the paid tuition system is used to reimburse professional training expenses of doctoral students (attending conferences, summer schools, training, programs abroad, publication of specialty papers or other specific forms of dissemination etc.).*

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.



- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself- The Self Evaluation report provides a summary of the logistics and financial support for the dissemination of the results of the scientific research of the Doctoral students by their participation in scientific conferences where they present scientific papers. Such information is included in Annex_A.1.3.3.c.

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself. Limited information is provided regarding the events' title and the dates where each event takes place. In total, 3,28% is the spending within the reporting period. There is no spending reported in years 2016 and 2018.

Recommendations:

The Faculty must invest to train PhD students to attend conferences, exhibitions, summer schools and utilise funds for open access publication fees.

There must be a KPI so that at least one dissemination activity is planned for each PhD student within the 3-year period of study. Ideally, one dissemination activity must be planned at the end of each year.

The supervisory committee could monitor the students to meet these targets.

The indicator is ~~fulfilled~~/partially fulfilled/not fulfilled.

Criterion A.2. Research infrastructure

The Faculty provides satisfactory environment regarding research facilities, equipment and infrastructure and access to scientific databases so that the PhD students can carry their PhD projects.

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

The research activities within the doctoral school can be conducted in 2 distinct centres: INCESA and Faculty of Mechatronics.

Performance Indicator A.2.1.1. *The venues and the material equipment available to the doctoral school enable the research activities in the evaluated domain to be carried out, in line with the assumed mission and objectives (computers, specific software, equipment, laboratory equipment, library, access to international databases etc.). The research infrastructure and the provision of research services are presented to the public through a specific platform. The research infrastructure described above, which was purchased and developed within the past 5 years will be presented distinctly.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself- The Annex_A.2.1.1.a1 provides information about infrastructure that could be used for research. Examples of such specialised equipment includes but not limited to haptic devices, Oculus Rift VR equipment, robots and video capturing. Additionally, the PhD students could use the facilities from INCESA research centre. The University provides access to a list of databases so that students have access to scientific databases.



- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself. By analysing the information provided (Leaflet), it is evident there is high quality infrastructure to support applied experimentation in the research community of the Faculty.

Recommendations:

The Faculty may need to utilise funds so that calibration in some research equipment may be required.

There is a process needed within the Faculty regarding the decision making for the purchase of the research infrastructure.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Criterion A.3. Quality of Human Resources

There is enough information in the Self Evaluation Report regarding the human resources. The resources seem to be satisfactory by considering the students' cohort.

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

There are 3 Professors in the Faculty to support the research activities. These academics have the qualifications and the skills to support the Doctoral program. However, this is a small team and cannot carry all the research activities in the field of Mechatronics and Robotics.

Performance Indicator A.3.1.1. *Minimum three doctoral thesis advisors within that doctoral domain, and at least 50% of them (but no less than three) meet the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates (CNATDCU) in force at the time when the evaluation is carried out, which standards are required and mandatory for obtaining the enabling certification.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself. This indicator meets the threshold requirements. The Faculty has provided the minimum number of required advisors.

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself. More information is expected to be provided in the Self Evaluation Report to determine the algorithm for the calculation of A1, A2 and A3 metrics for each academic. The academics meet the criteria that have been set-up by ARACIS.

Recommendations:

Recruit more staff to support all the research activities.

The Web profile of the supervisors must provide in different tabs with the following information: research area, research students, key publications and grants. Such information must be provided in both Romanian and English.

The research outcome can be improved by engaging with other Faculties (e.g. Mechanical Engineering).

The indicator is fulfilled/partially fulfilled/not fulfilled.



Performance Indicator *A.3.1.2. *At least 50% of all doctoral advisors have a full-time employment contract for an indefinite period with the IOSUD.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself-* Within the field of Mechatronics and Robotics, all the doctoral supervisors affiliated to the "Constantin Belea" Doctoral School are tenured (Annex_A.3.1.2.a, Annex_1.1.3).

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself-* This is a small cohort of academics that cannot support all areas defined in section 1.2.3 of the Self-Evaluation Report.

Recommendations:

Make the research activity more focussed/specialised. Engage with Mechanical Engineering School so that there are enough supervisors.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator A.3.1.3. *The study subjects in the education program based on advanced higher education studies pertaining to the doctoral domain are taught by teaching staff or researchers who are doctoral thesis advisors / certified doctoral thesis advisors, professors / CS I or lecturer / CS II, with proved expertise in the field of the study subjects they teach, or other specialists in the field who meet the standards established by the institution in relation with the aforementioned teaching and research functions, as provided by the law.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The Self-Evaluation report provides a short summary of the courses that the academics teach. More detailed information is provided in Annexes A.3.1.3. Annex_A.3.1.3.a-A3.1.3.k that are described in Romanian language. The academics cover a variety of topics related to research methods, such as Research Methods, Ethics and Academic Integrity, Advanced Mechatronics Systems, Advanced Robotic Structures and Systems etc. From the CVs of the academics, it seems that they have the expertise to deliver the planned training. There is information provided regarding guest lectures from scientists from abroad.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself-* There is a capability of the academics to teach all these modules. However, the research activities are quite broad and it is difficult to produce high quality research papers in such broad fields with such small cohort of academics. Through the interaction with the PhD students, the Doctoral program provides the same courses as the Master program. There is no mechanism to check the fact that a PhD student may repeat a course during the Doctoral program. The method of evaluation is not focussed on critical analysis and preparation of the PhD students to write scientific reports. The material for the courses should be mainly scientific papers from high-impact journals and conferences.

Recommendations:

Revise course curriculum using latest research papers. Use coursework in each module as a method of assessment

Link the research strategy with the research facilities

Use the facilities to provide consultancy services to companies



Liaise with Mechanical Engineering to improve delivery

The indicator is ~~fulfilled~~/partially-fulfilled/not fulfilled.

Performance Indicator *A.3.1.4. *The percentage of doctoral thesis advisors who concomitantly coordinate more than 8 doctoral students, but no more than 12, who are themselves studying in doctoral programs³ does not exceed 20%.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself-* According to Annex_A.3.1.4, it turns out that there are no doctoral supervisors in the field of Mechatronics and Robotics who coordinate more than 8 PhD candidates at the same time. Therefore, this criterion is met.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself-* There is a small number of academics. This is a major obstacle to increase the number of PhD students in the program.

Recommendations:

N/A

The indicator is ~~fulfilled~~/partially-fulfilled/not fulfilled.

Standard A.3.2. The Doctoral advisors within the domain are carrying out a scientific activity visible at international level.

The Academics of the Faculty have a long experience of carrying out research with outcome presented at both national and international level in journals and conferences.

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.*

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.



- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself- The research output of the PhD supervisors is provided in Annex_A.3.2.1.b, Annex_A.3.1.1.b1, Annex_A.3.1.1.b2 and Annex_A.3.1.1.b3). There is no detailed information in the Self-Evaluation report how P1 and P2 components have been calculated. The component P1 is determined that is linked with relevant publication results and the second component P2 regards the Visibility in the scientific world.

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself- There is no detailed information in the Self-Evaluation report regarding the metrics P1 and P2 for each academic. The PhD supervisors have research output in journals and conferences that are internationally recognised.

Recommendations:

The Department needs to adopt strategy to improve the visibility of the academic staff and assess them using P1 and P2 metrics.

The indicator is ~~fulfilled~~/partially fulfilled/not fulfilled.

Performance Indicator *A.3.2.2. At least 50% of the doctoral thesis advisors in a specific doctoral study domain continue to be active in their scientific field, and acquire at least 25% of the score requested by the minimal CNATDCU standards in force at the time of the evaluation, which are required and mandatory for acquiring their enabling certificate, based on their scientific results within the past five years.

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself- All Doctoral supervisors are scientifically active in the last five years. This has been highlighted in the Annex_A.3.2.2.a1, Annex_A.3.2.2.a2, Annex_A.3.2.2.a3.

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself- All Academic academics are research active and meet the criteria of CNATDCU.

Recommendations:

The indicator is ~~fulfilled~~/partially fulfilled/not fulfilled.

Domain B. EDUCATIONAL EFFECTIVENESS

The Faculty has organised a number of courses at the first year of the program. It seems that all these courses overlap with the Master program. There is a research plan with an objective to carry out training in the context of internship, research and secondment opportunities.

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

The vast majority of the PhD candidates have graduated from the University of Craiova.

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 Doctoral School “Constantin Belea”, has been trying in the last period of time, to attract candidates that have completed their Master's programme from other universities/academic institutions. However, it seems that the vast majority of the PhD candidates have graduated from the same 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.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself-* In the period 2015 - 2020, 9 places from the state budget have been allocated for admission to the Doctoral School in the field of Mechatronics and Robotics. In order to occupy the 9 budgeted places, a total number of 16 candidates presented themselves at the admission. There are 9 students enrolled on budget come from the master's programs at the University of Craiova (8 PhD candidates completing their masters at the Faculty of Automation, Computers and Electronics), and of the 7 admitted to the fee, 4 PhD candidates completed the master's degree at another university. Therefore, the ratio between the number of candidates in the last five years and the number of places financed from the state budget put up for competition within the field of doctoral studies, the result is $16/9 = 1.77 > 1.2$. The required cut-off threshold metric has been met.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* It seems that the intake includes students that they have graduated from the same University. It is important that the Faculty and the University implements an openness strategy to attract graduates from other Universities.

Recommendations:

Improve the openness of the program. Define a strategic plan to attract students from other Universities

Highlight the Competitive advantage of the Doctoral Program and its link with industrial partners

Improve the information of the web site in both English and Romanian

Use of social media to promote research outputs

Use alumni to attract new students

The indicator is fulfilled/~~partially fulfilled~~/not fulfilled.

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

The process regarding admission, monitoring and evaluation seems to be transparent.

Performance Indicator *B.1.2.1. *Admission to doctoral study programs is based on selection criteria including: previous academic, research and professional performance, their interest for scientific or arts/sports research, publications in the domain and a proposal for a research subject. Interviewing the candidate is compulsory, as part of the admission procedure.*



- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself*- The admission has used a variety of criteria considering the academic performance of the candidates from Cycle I and II. Thus, only graduates who obtained an average of 8 in the previous cycle of studies (long form master) have been considered. Additionally, an arithmetic mean has been calculated between the average of the years of study and the average of the exam (long form) of the master's degree.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself*- The knowledge of English language is not considered as a metric, since most scientific publications are in English. Additionally, there are no special arrangements for DDS students.

Recommendations:

Good level of English (speaking and writing) is required. Certification such as IELTS should be considered.

Special arrangements should be considered for DDS students.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator B.1.2.2. *The expelling rate, including renouncement / dropping out of doctoral students 3, respectively 4, years after admission⁴ does not exceed 30%.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* Table B.1.2.1.1. summarizes the expelling rate of the doctoral students in the field of Mechatronics and Robotics. Based on this information, out of the 16 candidates who were registered, only 3 of them were expelled. The dropout percentage is therefore $3/16 = 0.18$, meaning $18\% < 30\%$, the standard being fulfilled.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* There is no detailed information regarding expelling rate varies over the years. Although this is a very small cohort of students, the report does not explain the reasons for these dropouts (e.g. skills, financial, personal reasons). The Faculty needs to provide support to students that face different challenges throughout the PhD studies. There may be a need to formalise the progress of the students on annual basis. Most of the students have submitted after the end of 4th year.

Recommendations:

Analyse the expelling rate and provide mechanism to reduce it.

Provide extra support to students that have difficulties on certain topics.

The indicator is fulfilled/partially fulfilled/not fulfilled.

⁴ 3 years for the doctoral university studies with the duration stipulated at Article 159, paragraph (3), respectively 4 years for the doctoral university studies with the duration stipulated at Article 174, paragraph (3) of the Law of national education No. 1/2011 with subsequent amendments and additions.



Criterion B.2. The content of doctoral programs

The program offers a variety of training activities including courses, secondment in another peer institution, conference and events participation, papers published in international journals and internships in companies.

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 curriculum (Annex_1.2.3) contains an in-depth study of the methodology of scientific research in the field of Mechatronics and Robotics, which also covers the subject of statistical data processing (Annex_A.3.1.3.a).

Performance Indicator B.2.1.1. *The training program based on advanced academic studies includes at least 3 disciplines relevant to the scientific research training of doctoral students; at least one of these disciplines is intended to study in-depth the research methodology and/or the statistical data processing.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The curriculum of the first year of training for Doctoral students (It is provided in Annex_1.2.3 and Annex_A.3.1.3.a in Romanian) has been designed to enhance simultaneously technical and transversal skills. The curriculum includes the following:

- Subjects that develop technical skills such as statistical data processing, AI, Computer Networks, Algorithm Analysis and Design, Multi-Agent Systems, Parallel Computing, Machine Learning, Web Systems and Technologies. After talking to graduates and Doctoral Students, the same courses are offered also at the Master level. There is a need at these courses evaluate critical thinking and assist students to write scientific manuscripts. There is no coherent method of evaluation (e.g. exam, coursework). The assessment method should be revisited. The students should study at this level research papers from high impact journals and conferences.

-Subjects that enhance various transversal competences-a compulsory course allowing for the in-depth study of the research methodology as a compulsory course designed to strengthen ethical behaviour in science.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The curriculum includes a diversity of technical courses as well as important courses related to research methods and academic integrity. The learning outcomes of each course are not clear. It is not clear whether students study scientific papers in the English language. The same applies to the evaluation of each course and the process to handle students that fail. Do the students have to do resit exams within the same year? What happens if students fail in more than 1 more module? Is there any interruption process? Looking at the statistics, it is very challenging to finish the program within 4 years of study.

Recommendations:

Introduce rules regarding progression in the courses that are attended in the first year.

The course material should be revised by using state of the art/survey research papers as a primary resource. Provide references (max. 3) per weekly activity for both lecture and laboratory work. Coursework must be one of the components for evaluation.

Introduce a compulsory module related to innovation management (patent filing, research commercialisation route, spin-off and start-up process).



Topics such as Web Technologies and Computer Networks do not have direct relation to the research field.

The indicator is fulfilled/partially fulfilled/not fulfilled.

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

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* Doctoral students in the first year attend the Ethics and academic integrity course, dedicated to ethics in scientific research and intellectual property delivered by a Doctoral supervisor from the doctoral field of Law (Doctoral School of the Faculty of Law), within the IOSUD, Prof. Gabriel OLTEANU, PhD.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The curriculum includes important topics related to ethics, plagiram and academic integrity.

Recommendations:

Define the course evaluation.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator B.2.1.3. *The IOSUD has mechanisms to ensure that the academic training program based on advanced university studies addresses „the learning outcomes”, specifying the knowledge, skills, responsibility and autonomy that doctoral students should acquire after completing each discipline or through the research activities⁵.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The academic from the doctoral study programme have consulted with Romanian Robotics Society and Romanian Society of Automation and Technical Informatics. Additionally, the students obtain skills and experience participating in events supported by IFR - International Federation on Robotics and the annual European Robotics Days. It is very good the fact the team uses the Erasmus program to plan scientific secondment to peer academic institutions abroad. The PhD committee is responsible for the training of each student and the design of internship mission. It is not clear how the English scientific language is considered throughout the training.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* It is not clear how critical thinking and analysis is embedded in the teaching methodology. There is also a questionnaire that is used to get feedback from students regarding their experience. It is not clear and there is no evidence how this feedback is used to improve training delivery. There is no systematic approach to the internships offered to the students.

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



Recommendations:

If students are assessed on examination papers, moderation must be applied to exam specifications and marking.

Critical Thinking and research independence methodology must be embedded in the training.

A systematic approach on internship opportunities must be defined.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator B.2.1.4. *All along the duration of the doctoral training, doctoral students in the domain receive counselling/guidance from functional guidance commissions, which is reflected in written guidance and feedback or regular meeting.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* Annex_B.2.1.4 provides the allocation of the supervisors providing advice / guidance, revising scientific manuscripts and providing feedback on the research progress from the regular meetings. The report does not provide evidence regarding these meeting. There is no sample regarding the feedback that students receive.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The Annexes indicate that the supervisors meet their PhD students to contribute to theoretical and scientific collaboration. However, there is limited information regarding the meetings, the topics of discussion and action points.

Recommendations:

An IT system is required to record the meetings between the student and the PhD supervisor and the action plan that was agreed from this meeting.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator B.2.1.5. *For a doctoral study domain, the ratio between the number of doctoral students and the number of teaching staff/researchers providing doctoral guidance must not exceed 3:1.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The 3 doctoral supervisors guide 11 PhD candidates in internship, one of them waiting for the confirmation after presenting the thesis at the beginning of 2021, according to according to Annex_A.3.1.4. The Table from the Self-Evaluation report shows that the ratio between the number of PhD candidates in study and the total number of teachers providing guidance is 1.3: 1.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The Faculty have resources to support only 9 PhD students. Either the Faculty must recruit additional academics or merge with another Faculty in order to be sustainable and grow the research outputs.

Recommendations:

The Faculty must define a strategy to grow the academics' team.



The indicator is fulfilled/~~partially fulfilled~~/not fulfilled.

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

The evaluation has been carried out taking into account doctoral students activities (training and internships) and research output per student.

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

The Self-Evaluation report presents a good overview of the results from the PhD Students in terms of presentations, paper published, research project participation, internship engagement and event training.

Performance Indicator B.3.1.1. *For the evaluated domain, the evaluation commission will be provided with at least one paper or some other relevant contribution per doctoral student who has obtained a doctor's title within the past 5 years. From this list, the members of the evaluation commission shall randomly select 5 such papers / relevant contributions per doctoral study domain for review. At least 3 selected papers must contain significant original contributions in the respective domain.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* This is a very challenging task to read and evaluate the research outcome in terms of publications. The following 5 research papers have been randomly selected.

- Liviu Florin Manta, Dorin Popescu, Ovidiu Unguritu, Horatiu Roibu, Marius Marian, Marian Abagiu, "Software Architecture for a Mobile Robot designed for Rescue Missions Support in Hazardous Environments" 2020 21th International Carpathian Control Conference (ICCC), 2020, pp. 1-6, doi: 10.1109/ICCC49264.2020.9257218.
- Cosmin Stoica Spahiu, Abagiu Marian, Liana Stanescu, "Automatic beams detection used for LiFi car-2-car communication" 2020 15th Conference on Computer Science and Information Systems (FedCSIS), 2020, pp. 431-434, doi: 10.15439/2020F72.
- Bazavan Lidia-Cristina, Roibu Horatiu, Andritoiu Dan, Bizdoaca Nicu George, "Cheap Automated Guided Vehicles - concept and experiments", Carpathian Control Conference, mai, 2019, Krakow-Wieliczka, Poland, IEEEExplore; 10.1109/CarpathianCC.2019.8766016 IEEE.
- Besnea F.L., Cismaru Ș.I., Bîzdoacă N.G., Smart tracking system for vehicles, Proceedings of the International Symposium on Power Electronics, Electrical Drives, Automation and Motion (SPEEDAM), 2018, pp. 1067 – 1072, DOI:10.1109/SPEEDAM.2018.8445256, Electronic ISBN: 978-1-5386-4941-1, WOS:000445031300174, Amalfi, Italy, 2018
- S.M. Grigorescu, Cosmin Ginerică, M. Zaha, G. Macesanu, B. Trasnea, "LVD-NMPC: A Learning- based Vision Dynamics Approach to Nonlinear Model Predictive Control for Autonomous Vehicles", Advanced Robotic Systems, Sage Journals, 2021.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The selected papers include original contributions that have been presented in international conferences and international journals with peer review process. The papers describe novel ideas supported by experimentation and theoretical analysis. The selected publications are recognized internationally.



Recommendations:

The Faculty must define a strategy so that the research outputs in international journals and conferences become internationally excellent.

~~The indicator is fulfilled/partially fulfilled/not fulfilled.~~

Performance Indicator *B.3.1.2. *The ratio between the number of presentations of doctoral students who completed their doctoral studies within the evaluated period (past 5 years), including posters, exhibitions made at prestigious international events (organized in the country or abroad) and the number of doctoral students who have completed their doctoral studies within the evaluated period (past 5 years) is at least 1.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The 3 graduates of the doctoral field of Mechatronics and Robotics from 2015 - 2020 and the graduate from 2021 capitalized on the theoretical knowledge gained and the experimental results obtained in research teams by publishing a number of articles in ISI-listed journals and indexed articles as well as presentations at 22 international scientific communications and events held in the country or abroad. The ratio between the number of papers and scientific achievements (22) and the number of graduates (3) is 7.33: 1. The requested metric has been met.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* Students have been presented their research outcome in conferences that are internationally recognised.

Recommendations:

The Faculty must adopt a strategy where at least (1) output can be presented in international excellent events that are supported by scientific organisations such as Institution of Mechanical Engineers and Institute of Electrical and Electronic Engineers.

~~The indicator is fulfilled/partially fulfilled/not 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 Faculty is engaged with academics from other national institutes for the defence of PhD theses.

Performance Indicator *B.3.2.1. *The number of doctoral theses allocated to one specialist coming from a higher education institution, other than the evaluated IOSUD should not exceed two (2) in a year for the theses coordinated by the same doctoral thesis advisor.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The composition of the commissions for public defence of theses from the last 5 years can be found in Annex_B.3.2.1a. This table summarizes an evaluation performed to highlight the number of participations of the members of the Thesis defence committees during a year, in the period 2015-2020. The Annex verifies that there were no situations in which a certain referent from a higher education institution, other than IOSUD - University of Craiova, to be involved in two commissions in the same academic year.



- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself. The results of this evaluation highlighted the fact that the academics taking part in the Thesis defence committees did not exceed 2 participations for the theses coordinated by the same doctoral supervisor in one year.

Recommendations:

Use a tracking system to monitor the external academics involved in the defence PhD theses.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator *B.3.2.2. *The ratio between the doctoral theses allocated to one scientific specialist coming from a higher education institution, other than the institution where the defense on the doctoral thesis is organized, and the number of doctoral theses presented in the same doctoral study domain in the doctoral school should not exceed 0.3, considering the past five years. Only those doctoral study domains in which minimum ten doctoral theses have been presented within the past five years should be analyzed.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself. Within the field of doctoral studies Mechatronics and Robotics, 3 doctoral theses were presented in the period 2015-2020, according to Annex_B.3.2.1.a.

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself. This is small cohort of students taking into account the small number of PhD supervisors. As I have highlighted previously, there is a need to increase the number of PhD supervisors to maintain this research in the entire Faculty.

Recommendations:

The Faculty must increase the number of PhD supervisors to maintain research sustainability.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Domain C. QUALITY MANAGEMENT

There is an internal quality management system that has been used for the monitoring and performance evaluation of the PhD students.

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

The Faculty has used a reasonable and realistic process in terms of admission, rules and expectations and monitoring of the activities associated with the PhD students. Such process is provided centrally by the University and has been adopted by the Faculty.

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 detailed workflow for the quality procedures in the Doctoral training program.

Performance Indicator C.1.1.1. *The Doctoral school in the respective university study domain shall demonstrate the continuous development of the evaluation process and its internal quality assurance following a procedure developed and applied at the level of the IOSUD, the following assessed criteria being mandatory:*

- (a) the scientific work of Doctoral advisors;*
- (b) the infrastructure and logistics necessary to carry out the research activity;*
- (c) the procedures and subsequent rules based on which doctoral studies are organized;*
- d) the scientific activity of doctoral students;*
- e) the training program based on advanced academic studies of doctoral students;*
- f) social and academic services (including for participation at different events, publishing papers etc.) and counselling made available to doctoral students.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself. The University evaluates and monitors the evolution of all the Doctoral Schools centrally. The rules of operation of the Doctoral Schools are provided in Annex_1.1.6.b. The Self-Evaluation Report of the Doctoral School in the field of Mechatronics and Robotics from 2016 and 2019 are provided in Annex_1.1.6.c3 and Annex_1.1.6.c4. The Regulation on the initiation, approval and periodic evaluation of study programs as a quality management system is given in Annex_C.1.1.1. The Quality Assurance procedures are described in Annex_C.1.1.1.b. Both Annexes are provided in Romanian.

- analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself. The University has adopted a clear methodology to enhance the engagement of the supervisory team. It is not clear how the KPIs (e.g. number of published papers, feedback from students, optimisation of resources in the research labs) are used to improve the training delivery. Additionally, records and evidence are important to be recorded to resolve potential conflicts between the students and the PhD supervisory team.

Recommendations:

Feedback is required in the methodology to improve Doctoral training.

Engagement of different stakeholders (e.g companies, public organisation) is required on the program design.

A workflow system is required for the conflict management.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator *C.1.1.2. *Mechanisms are implemented during the stage of the doctoral study program to enable feedback from doctoral students allowing to identify their needs, as well as their overall level of satisfaction with the doctoral study program in order to ensure continuous improvement of the academic and administrative processes. Following the analysis of the results, there is evidence that an action plan was drafted and implemented.*

- description of the facts, the findings from the assessed institution's documents and the evaluation visit itself. In order to evaluate the degree of satisfaction of Doctoral students regarding the quality of doctoral programmes, an anonymous Questionnaire for student evaluation of the Doctoral School, advanced university and scientific research programmes was developed and accompanied by



instructions. The questionnaire mentioned above requests the opinion of the Doctoral students the questions referring mainly to the teaching activities developed within the University Programme of Advanced Training (PPUA) and aiming at “the learning outcomes” - the competencies, skills and attitudes that Doctoral students should develop. The data collected using the electronic system are analysed by the IOSUD-UCV Office using appropriate quantitative and qualitative tools and further processed to generate an annual report on the degree of satisfaction of Doctoral students at the IOSUD-UCV level. Since there is no detailed information about the questionnaire, it is difficult to provide comments It is not clear how students’ feedback is used to improve the program. The questionnaire has not been provided and it is not clear whether there are questions regarding areas where level of dissatisfaction is high.

Recommendations:

Use a systematic approach so that students’ feedback is used to enhance the Doctoral training program.

The indicator is fulfilled/partially fulfilled/not fulfilled.

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

There is information on Web site of the Faculty regarding the Doctoral training program and the expectations from the PhD students. There is also enough support regarding the learning resources through access to important scientific databases.

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

Most of the information on the Web is presented in Romanian. After interacting with the Faculty members and the students, there are some events organised where the PhD program is presented to the Master students. There is a need to advertise the PhD program at national level.

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

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



- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The "Constantin Belea" Doctoral School ensures the transparency of information and accessibility to learning resources by displaying on the IOSUD-UCV website, as well as on the faculty websites the necessary information for doctoral students, in compliance with general regulations regarding data protection (https://www.ucv.ro/invatamant/educatie/programe_doctorat/prezentare_programe_de_doctorat.php#, <https://www.ucv.ro/>, <http://www.ace.ucv.ro/>). The Self-Evaluation report provides links to the regulations, Admission, Doctoral studies contract, Regulations for the completion of studies, including the procedure for public presentation of the thesis and the procedure for online presentation of doctoral theses, Content of study programs, the scientific profile and research interests / topics of the doctoral supervisors in the school, as well as their institutional contact details, list of PhD candidates in the school with basic information (year of enrolment; supervisor), Information on the elaboration standards of the doctoral thesis and Links to abstracts of doctoral theses to be presented publicly, as well as the date, time, place where they will be presented, at least 20 days before the defense.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The Faculty has provided all the requested information. Further analysis cannot be done since the information is in Romanian.

Recommendations:

The Academics and the Doctoral students must use their corporate email for all University activities. This important to maintain the GDPR policy.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Standard C.2.2. The IOSUD/The Doctoral School provides doctoral students with access to the resources needed for conducting doctoral studies.

Overall, I have seen that the Faculty provides the appropriate resources to students to carry out their research activities.

Performance Indicator C.2.2.1. All doctoral students have free access to one platform providing academic databases relevant to the doctoral studies domain of their thesis.

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The Faculty has provided the appropriate resources to the students. This includes access to scientific databases, individual training (where specific support involves access to the literature, tutorials and advice from the Advisory committee and the supervisor, etc.), basic and applied research resources (where support involves research facilities, modern equipment and advice/mentoring from the Advisory committee and the supervisor, etc.).

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The Faculty provides sufficient resources to the students. If the cohort gets larger, more PhD supervisors are required.

Recommendations:

The indicator is fulfilled/partially fulfilled/not fulfilled.



Performance Indicator C.2.2.2. *Each doctoral student shall have access, upon request, to an electronic system for verifying the degree of similarity with other existing scientific or artistic works.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The University ensures the verification of the authenticity and originality of doctoral thesis and other scientific papers. IOSUD - University of Craiova uses a dedicated software, <https://sistemantiplagiat.ro/>, where the thesis is directly compared with texts from external databases. It can signal similarities between the verified text and the texts with which it was compared.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* It is very positive that plagiarism/academic misconduct is managed centrally by the University. This policy must be extended to scientific manuscripts/publications.

Recommendations:

Apply plagiarism investigation to scientific manuscripts that are submitted for publication to international journals and conferences.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Performance Indicator C.2.2.3. *All doctoral students have access to scientific research laboratories or other facilities depending on the specific domain/domains within the Doctoral School, according to internal order procedures.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* As described in Section B, the students have access to state-of-the-art labs that could be used for the research experimentation. The access of Doctoral students to these facilities is unrestricted, but a well-established schedule with the Doctoral supervisor has been established. In these laboratories, Doctoral students are assisted by an engineer or technician, who facilitates the operation of various equipment.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The quality and quantity of the research infrastructure is sufficient to support the research activities of the students. The Self-Evaluation does not contain information when part of the research infrastructure becomes obsolete. A replacement process is required.

Recommendations:

A process is required to replace research infrastructure that becomes obsolete.

The indicator is fulfilled/partially fulfilled/not fulfilled.

Criterion C.3. Internationalization

To enhance internationalization, the University collaborating with embassies, Fulbright organizations, AUF, British Council, French Cultural Institute, Goethe Institute and "Cervantes" Institute.

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



There is a clear strategy of the University to enhance its Internationalization. There are few events organised where attendees from abroad participated. The University has established the Eugen Ionescu Scholarship program to establish Doctoral students from abroad. However, not enough evidence has been provided regarding joint research programs and collaborative post-doc research with peer institutions from abroad.

Performance Indicator *C.3.1.1. *IOSUD, for every evaluated domain, has concluded mobility agreements with universities abroad, with research institutes, with companies working in the field of study, aimed at the mobility of doctoral students and academic staff (e.g., ERASMUS agreements for the doctoral studies). At least 35% of the doctoral students have completed a training course abroad or other mobility forms such as attending international scientific conferences. IOSUD drafts and applies policies and measures aiming at increasing the number of doctoral students participating at mobility periods abroad, up to at least 20%, which is the target at the level of the European Higher Education Area.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The University has established ERASMUS+ partnership agreements with 63 universities (Annex C.3.1.1. - IM) including doctoral student mobility. There are Doctoral students participated in winter/summer schools. PhD candidates have participated in international conferences and publishing articles in prestigious international journals (Annex_B.3.1.1.c1- Annex_B.3.1.1.c10). The aforementioned criterion has been met.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* Most of the students have participated in events and training schools at both national and international level. I suggest to define a KPI so that each student must participate at least in 1 event during the three years.

Recommendations:

Define a KPI regarding participation/training in events and winter/summer schools.

~~The indicator is fulfilled/partially fulfilled/not fulfilled.~~

Performance Indicator C.3.1.2. *In the evaluated doctoral study domain, support is granted, including financial support, to the organization of doctoral studies in international co-tutelage or invitation of leading experts to deliver courses/lectures for doctoral students.*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* Table C.3.1.2.1 provides a list of Academics that have been invited to give lectures at the Doctoral School "CONSTANTIN BELEA".

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* There is a large of invited talks during 2020 (probably the talks were carried on-line). There are sporadic talks of invited lectures in the period 2013-2019. The Faculty needs to define a strategy to organize guest lectures in a systematic manner and liaise with Institute of Mechanical and Electrical and Electronic Engineers. The University should exploit ERASMUS agreements so that peer academic from the collaborative institutions could give guest lectures to the students.



Recommendations:

Define a strategy to organise guest lectures in a systematic manner

The indicator is ~~fulfilled~~/partially fulfilled/not fulfilled.

Performance Indicator C.3.1.3. *The internationalization of activities carried out during the doctoral studies is supported by IOSUD through concrete measures (e.g., by participating in educational fairs to attract international doctoral students; by including international experts in guidance committees or doctoral committees etc.).*

- *description of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* There are three papers through the collaboration with peer academics from national and international institutions.

- *analysis of the facts, the findings from the assessed institution's documents and the evaluation visit itself.* The collaboration with international experts has been carried out on ad-hoc basis. There is one collaboration from an academic from abroad that is verified through a joint publication. There is a need to provide a strategy to establish this collaboration in a more systematic manner. There is no defined strategy to attract international students.

Recommendations:

Define a strategy to attract international students

The Faculty should establish joint-research collaboration with peer institutions from abroad.

The indicator is ~~fulfilled~~/partially fulfilled/not fulfilled.

IV. SWOT Analysis

<p><u>Strengths:</u></p> <ul style="list-style-type: none"> - Modernisation of the curriculum. - Industrial collaboration with industrial partners from the Region - Investment in building infrastructure and research equipment -Well-defined workflow for admission and monitoring of the PhD students. 	<p><u>Weaknesses:</u></p> <ul style="list-style-type: none"> -The research areas are too broad in comparison with the number of academic staff. -Lack of systematic collaboration with national industries and public stakeholders. -Lack of a culture to establish collaboration among the PhD students for joint publications. -Lack of clear strategy to attract foreign PhD students.
<p><u>Opportunities:</u></p> <ul style="list-style-type: none"> - Explore the competitive advantage of the region to attract students from the neighbouring countries (Serbia, Bulgaria). -Manage the innovation systematically through patent filing and IPRs 	<p><u>Threats:</u></p> <ul style="list-style-type: none"> - The number of academic staff is rather small to support the research of the Faculty. -The financial support may not be attractive for the talented graduates who prefer to pursue PhD studies abroad.

	<p>-The overlapping research activities with other Doctoral School poses questions regarding program sustainability.</p> <p>- Pandemic has major impact on studies and on-line teaching methodologies must be adopted.</p>
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V. Overview of judgments awarded and of the recommendations

No.	Type of indicator (*, C)	Performance indicator	Judgment	Recommendations
1	A	A.1.1.1.	Partially Fullfilled	<p>-The research area and strategy is too broad for such a small faculty team of academics.</p> <p>-The Department needs to align the research proposals with the research strategy.</p> <p>-The Doctoral programs need to provide training on soft-based skills (e.g. project management, presentation skills, entrepreneurship, patent filing).</p> <p>-The Faculty should make arrangements for candidates with disabilities</p> <p>-There is no process regarding the interaction among the PhD students to work in group-based projects.</p> <p>-There is a need to introduce a process to evaluate PhD progress every six-twelve months.</p>

				-It seems that there is no process regarding the replacement of students/academic that leave the University and have been selected as members of the Council.
2	A	A.1.1.2	Fullfilled	<p>-A more clear process is required regarding the allocation and even distribution of students to supervisors.</p> <p>-There is a need to align the research projects with research mission and objectives</p> <p>-There is a need to utilise the Doctoral Committee to formalize PhD progress on annual basis and decision-making.</p> <p>- There is a need to establish more systematic collaboration between the Doctoral students and the other researchers within the Faculty.</p>
3		A.1.2.1		<p>-Use of central system to record meetings between the Supervisor Team and the PhD student.</p> <p>-Use of the IT system to support the alumni.</p>
4	A	A.1.2.2	Fullfilled	<p>- Use of anonymised samples of PhD theses to train students.</p> <p>-Use the tool to analyse the scientific manuscripts that have</p>

				<p>been written by the PhD students</p> <ul style="list-style-type: none"> -Make clear the penalty imposed in case plagiarism detected.
5	A	A.1.3.1	Fullfilled	<ul style="list-style-type: none"> -Link the research strategy and objectives with the research grants -Since the academic team is very small, there is a need to narrow down the research areas and priorities - Liaise with Faculty of Mechanical Engineering to maximise research output
6	A	A.1.3.2	Fullfilled	<p>The following weaknesses have been identified:</p> <ul style="list-style-type: none"> - Liaise with the industrial and public authorities and stakeholders to furrther exploit opportunities for the PhD students. <p>Increase the number of research proposals at both national and international level.</p> <p>There is no detailed information regarding different PhD projects to demonstrate a coherence to meet research objectives.</p>
7	A	A.1.3.3.	Partially Fullfilled	<ul style="list-style-type: none"> -The Faculty must invest to train PhD students to attend conferences,exhibition, summer schools and

				<p>utilise funds for open access publication fees.</p> <p>-There must be a KPI so that at least one dissemination activity is planned for each PhD student within the 3 year periods of study. Ideally, one dissemination activity must be planned at the end of each year. The supervisory committee could monitor the students to meet these targets.</p>
8	A	A.2.1.1.	Fullfilled	<p>-The Faculty may need to utilise funds so that calibration in some research equipment may be required.</p> <p>-There is a process needed within the Faculty regarding the decision making for the purchase of the research infrastructure.</p>
9	A	A.3.1.1.	Fullfilled	<p>- Recruit more staff to support all the research activities.</p> <p>-The Web profile of the supervisors must provide in different tabs with the following information: research area, research students, key publications and grants. Such information must be provided in both Romanian and English.</p>

				-The research outcome can be improved by engaging with other Faculties (e.g. Mechanical Engineering).
10	A	A.3.1.2	Fullfilled	- Make the research activity more focussed/specialised. Engage with Mechanical Engineering School so that there are enough supervisors.
11	A	A.3.1.3	Partially Fullfilled	-Use coursework in each course as a method of assessment -Revise the courses to meet PhD students requirements (advanced topics beyond Master level) -Link the research strategy with the research facilities -Liaise with Mechanical Engineering to improve delivery
12	A	A.3.1.4	Fullfilled	N/A
13	A	A.3.2.1	Partially Fullfilled	The Department needs to adopt strategy to improve the visibility of the academic staff and assess them using P1 and P2 metrics.
14	A	A.3.2.2	Fullfilled	N/A
15	B	B.1.1.1	Fullfilled	-Improve the openness of the program. Define a strategic plan to attract students from other Universities -Highlight the Competitive advantage

				<p>of the Doctoral Program and its link with industrial partners</p> <ul style="list-style-type: none"> -Improve the information of the web site in both English and Romanian -Use of social media to promote research outputs Use alumni to attract new students
16	B	<i>B.1.2.1.</i>	Fullfilled	<ul style="list-style-type: none"> -English knowledge (speaking and writing) is essential. Certification such as IELTS should be considered. -Special arrangements should be considered for DDS students.
17	B	<i>B.1.2.2.</i>	Fullfilled	<ul style="list-style-type: none"> -Analyse the expelling rate and provide mechanism to reduce it. -Provide extra support to students that have difficulties on certain topics.
18	B	<i>B.2.1.1.</i>	Partially Fullfilled	<ul style="list-style-type: none"> -Introduce rules regarding progression in the courses that are attended in the first year. -The course material should be revised by using state of the art/survey research papers as a primary resource. Provide references (max. 3) per weekly activity for both lecture and laboratory work. Coursework

				<p>must be one of the components for evaluation.</p> <p>-Introduce a compulsory module related to innovation management (patent filing, research commercialisation route, spin-off and start-up process).</p> <p>-Topics such as Web Technologies and Computer Networks do not have direct relation to the research field.</p>
19	B	<i>B.2.1.2.</i>	Fullfilled	-Course evaluation is not clear and it must be defined.
20	B	<i>B.2.1.3.</i>	Partially Fullfilled	<p>-If students are assessed on examination papers, moderation must be applied to exam specifications and marking.</p> <p>-Critical Thinking and research independence methodology must be embedded in the training.</p> <p>-A systematic approach on internship opportunities must be defined.</p>
21	B	<i>B.2.1.4.</i>	Partially Fullfilled	-An IT system is required to record the meetings, agenda and the action plan.
22	B	<i>B.2.1.5.</i>	Fullfilled	<i>-The Faculty must define a strategy to grow the academics' team.</i>

23	B	<i>B.3.1.1</i>	Fullfilled	-Define a strategy so that the research outputs become internationally excellent.
24	B	<i>B.3.1.2.</i>	Fullfilled	-The School must adopt a strategy where at least (1) output can be presented in international excellent events that are supported by scientific organisations such as Institution of Mechanical Engineers and Institute of Electrical and Electronic Engineers.
25	B	<i>B.3.2.1.</i>	Fullfilled	-Use a tracking system to monitor the external academics involved in the defence PhD theses.
26	B	<i>B.3.2.2</i>	Fullfilled	The Faculty must increase the number of PhD supervisors to maintain research sustainability.
27	C	<i>C.1.1.1.</i>	Fullfilled	-Feedback is required in the methodology to improve Doctoral training. -Engagement of different stakeholders (e.g companies, public organisation) on the program design is important.
28	C	<i>C.1.1.2.</i>	Partially Fullfilled	-Use a systematic approach so that students' feedback is used to enhance the

				Doctoral training program.
29	C	C.2.1.1.	Fullfilled	The Academics and the Doctoral students must use their corporate email for all Univerity activities. This important to maintaine the GDPR policy.
30	C	C.2.2.1.	Fullfilled	N/A
31	C	C.2.2.2.	Fullfilled	Apply plagiarism investigation to scientific manuscripts that are submitted for publication to international journals and conferences.
32	C	C.2.2.3.	Fullfilled	A proces is required to replace research infrastructure that becomes obsolete.
33	C	C.3.1.1.		Define a KPI regarding participation in events and winter/summer schools
34	C	C.3.1.2.	Partially Fullfilled	-Define a strategy to organise guest lectures in a systematic manner.
35	C	C.3.1.3.	Partially Fullfilled	-Define a strategy to attract international students -The Faculty should establish joint-research collaboration with peer institutions from abroad.
36				-Adopt a strategy where academics and students use corporate emails when sending messages to external stakeholders. This is important to be



				compliant with GDPR policy.
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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

I am satisfied with the overall Doctoral training program. The Faculty has designed and implemented an interested Doctoral program in the area of Mechatronics and Robotics. Although small, the PhD supervisor team has produced interesting research results. Few weaknesses have been identified that should be considered to grow the PhD community and produce excellent scientific results.

VII. Annexes

The following types of documents shall be attached:

- *The detailed schedule of the evaluation visit – MANDATORY.*
- *The survey questionnaire applied to doctoral students or academic staff in the doctoral study domain under review, the results - optional (e.g., in graphic form) and their interpretation - if applicable.*
- *Scanned documents – any document requested from the IOSUD during the evaluation visit and received, which is not found in the internal evaluation file received before the visit and referred to in the report.*
- *Pictures – if relevant issues are raised regarding the condition of the student residences, cafeterias, premises for teaching and learning activities, library etc.*
- *Screenshots/Print screens of the Doctoral School/IOSUD website proving specific claims in the report, accompanied by the date when they were accessed and saved.*
- *Any other documents relevant to the evaluation process referred to in the report.*

Professor Anastasios Dagiuklas