

Annex No. 3

The External Evaluation Report of a Doctoral Study Domain

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I. Introduction¹

This report was drafted during the evaluation visit of the doctoral studies field SYSTEMS ENGINEERING within the OIL-GAS UNIVERSITY OF PLOIEŞTI. The visit took place between September 20 and 24, 2021, and the composition of the commission of evaluators was:

- Prof.dr.ing. Marian Barbu "Dunărea de Jos" University of Galați;
- Prof.dr.ing. Ramon Vilanova Arbos Autonomous University of Barcelona;
- Drd.ing. Alexandru Marian Chiru Polytechnic University of Timisoara.

In IOSUD - Petroleum-Gas University of Ploiesti (UPG) there is a multidisciplinary doctoral school. This Doctoral School organizes doctoral studies in the following fields: Mines, Oil and Gas, Mechanical Engineering, Systems Engineering and Chemical Engineering. Two doctoral fields, Industrial Engineering and Chemistry, are in liquidation. According to those mentioned in the internal evaluation report, 104 doctoral students work within the Doctoral School.

According to the internal evaluation report, "Petrol-Gas University of Ploiești assumes the mission of generating and transferring knowledge to society through initial and continuous training at university and postgraduate level, in order to personal development, professional insertion of the individual and to satisfy the competence need of the socio-economic environment through scientific research, development, innovation and technological transfer, through individual and collective creation, in the field of sciences, engineering sciences, economic sciences, arts, socio-human sciences, medical sciences , of legal sciences, by ensuring the performances and physical and sports development, as well as the capitalization and dissemination of their results."

The PhD field in Systems Engineering is based on the master's program Advanced Automation and consists of 6 PhD supervisors and 12 PhD students at the time of evaluation.

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



II. Methods used

In the external evaluation process, before, and during the evaluation visit, the following methods and tools were used:

- Analysis of the Report of internal evaluation of the field of doctoral university studies
- evaluated and its annexes;
- Analysis of documents, data and information available on the IOSUD / School / Schools website
- Doctorates, in electronic format;
- Visit to buildings from the institution's patrimony, which include:
 - \circ classrooms;
 - secretariat;
 - \circ $\;$ laboratories and research centers;
- Meeting / online discussions with doctoral students in the field of evaluated doctoral university studies;
- Meeting / online discussions with graduates in the field of doctoral studies evaluated;
- Meeting / online discussions with employers of graduates in the field of doctoral studies evaluated;
- Online meeting / discussions with the management of the Doctoral School in which the field of evaluated doctoral university studies operates;
- Online meeting / discussions with doctoral supervisors in the field of evaluated doctoral university studies;
- Online meeting / discussions with the person in charge of the evaluated doctoral university field and with the team that made the internal evaluation report;
- Online meeting / discussions with directors / managers / research laboratories related to the field of doctoral studies;
- Meeting / discussions with representatives of the various structures of IOSUD / School / Schools Doctoral degrees in which the evaluated doctoral university field of work operates:
 - The Doctoral School Council, the University Senate, the Board of Directors, the Evaluation and Quality Assurance Commission, the Quality Assurance Department, the Ethics Commission (including with the students representing these structures);
 - Career Counseling and Guidance Center;
 - student organizations;
- Application of questionnaires to doctoral students in the field of evaluated doctoral university studies.



III. Analysis of ARACIS's performance indicators

Domain A. INSTITUTIONAL CAPACITY

IOSUD from the Petroleum-Gas University of Ploieşti generally proves a good institutional capacity, which allows the development of doctoral studies in appropriate quality conditions.

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

Standard A.1.1. The institution organizing doctoral studies (IOSUD) has implemented the effective functioning mechanisms provided for in the specific legislation on the organization of doctoral studies.

IOSUD within the Petroleum-Gas University of Ploieşti has approved and implemented the regulations provided in the specific legislation regarding the organization of doctoral studies.

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.

There do exist specific regulations and their application at school level doctoral studies of which the field of doctoral university studies is part

<u>Recommendations</u>: It is recommended that all decisions of the Doctoral School Board be posted on the school's website, and some pages should be translated into English. Continuing the effort of constantly updating the website of the Doctoral School so that both doctoral supervisors and doctoral students or candidates for admission can find all the necessary information



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.

Documentary proof is provided of the criteria, procedures and standards.

Recommendations: No further actions are required

The indicator is fulfilled.

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

IOSUD within the Petroleum-Gas University of Ploieşti has the software resources necessary to fulfill in good conditions the mission of doctoral studies.

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.

In the Petroleum-Gas University of Ploiesti there is an information system for the record of doctoral students and their academic career, the Didactic Information System. The existence of this was certified during the visit to UPG Ploiesti.

<u>Recommendations</u>: No further actions are required

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.

In the Petroleum-Gas University of Ploiesti there is a software system for plagiarism detection - https://sistemantiplagiat.ro/. PhD students have access to this software, and Annex A122_Similarity Reports 2019 contains evidence of its use.

Recommendations: It's not necessary.



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.

IOSUD from the Petroleum-Gas University of Ploieşti must improve the use of financial resources in order to reach an optimal level.

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.

At the request of the evaluation committee, UPG provided the list of research projects in the field of Systems Engineering for the period 2016 - 2020. 4 research grants conducted in the reference period were identified, all involving doctoral students.

Recommendations: It is recommended to constantly update the list of national and international research grants. It is recommended to expand public-private partnerships with innovation-oriented companies in the field of Systems Engineering.

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%.

The internal evaluation report mentions the support provided by IOSUD UPG Ploieşti by exempting from payment the doctoral students who exceed the duration of the 3-year internship. However, this situation does not apply to scholarships or support through research or institutional grants.

At the request of the evaluation committee, UPG provided the list of doctoral students who receive support. These are two doctoral students, but from the documents provided it is about the support for the development of a robot, respectively for the purchase of equipment and not about a support for at least six months.

Recommendations: It is recommended to attract the private environment for granting scholarships for at least six months for doctoral students or to obtain grants for additional support for doctoral students.

The indicator is partially 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.).

The internal evaluation report mentions that in the case of Systems Engineering, the amounts used from the total related amounts are on average 7.25% for the academic years 2016-2017, 2017-2018, 2018-2019 and 2019-2020.

At the request of the evaluation committee, UPG redid this calculation including exemptions from tuition and doctoral support fees. However, these exemptions cannot be included in the amounts used to reimburse the training expenses of doctoral students as provided in the criterion.

Recommendations: Establish a consistent annual amount to be allocated for each doctoral student from the total doctoral grants and tuition fees and to be made available to the doctoral student to be spent, according to the legal regulations in force, in the interest of completing the doctoral thesis.

The indicator is partially fulfilled

Criterion A.2. Research infrastructure

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

The Doctoral School of the Petroleum-Gas University of Ploieşti has a good quality research infrastructure that can properly support the activities specific to doctoral studies.

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.

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.



For the field of Systems Engineering, the Doctoral School within UPG Ploieşti benefits from an endowment corresponding to the evaluated field and in accordance with the assumed mission and objectives. The research infrastructure is that of the Center for Advanced Research in Automation, Computers and Electronics and it is presented on the web pages of the Department of Automation, Computers and Electronics, but also within the ERRIS platform. The situation was certified by the on-site visit. For the analysis of the criterion, the research infrastructure acquired and developed in the last 5 years was requested and provided by the hosts.

Recommendations: No further actions are required

The indicator is fulfilled

Criterion A.3. Quality of Human Resources

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

The Systems Engineering field at the Petroleum-Gas University of Ploieşti has a qualified staff with experience for carrying out the doctoral study program.

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.

Within the field of Systems Engineering, there are 6 doctoral supervisors. According to the internal evaluation report, 3 of them meet the standards of evaluation, necessary and mandatory to obtain the certificate of authorization, so it is a percentage of 50% equal to the minimum required by the criterion.

Recommendations: No further actions are required

The indicator is fulfilled

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



There was the need to ask for supplementary material and clarifications regarding PhD supervisors holding IOSUD. The reply was received in the form of additional annexes. These documents refer to the quality of holder that one of the doctoral supervisors has during the academic year 2020-2021, in which the evaluation visit took place, mentioning that "The decision of the University Senate no. 8/22 July 2021, Ar. 11 refers to the academic year 2021-2022 ".

Taking into account the formulation of the criterion, the commission evaluated and established the degree of fulfillment of the indicator related to the criterion, taking into account strictly the situation at the time of submitting the internal evaluation file to ARACIS and the situation at the time of the visit.

Recommendations. No further actions are required

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.

All the disciplines within the training program based on advanced university studies related to the field of PhD Systems Engineering are supported by teachers with the title of professor who have the quality of doctoral supervisor, or by professors or lecturers with extensive experience in the field of taught subjects.

Recommendations. No further actions are required

The indicator is fulfilled

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

At the request of the evaluation committee, the hosts included in Annex 1s the situation with the doctoral students existing at the time of the visit. According to this

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.



situation, there are no cases of doctoral supervisors with more than 3 doctoral students.

Recommendations. No further actions are required

The indicator is fulfilled

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

The Systems Engineering field at the Petroleum-Gas University of Ploieşti has doctoral supervisors with an internationally visible scientific activity.

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.

According to the situation presented in the internal evaluation report, Annex 321, all PhD supervisors in the field of Systems Engineering have at least 5 indexed papers Web Of Science (Clarivate Analytics). Also, the data presented show that they have international visibility in the last five years.

Recommendations. No further actions are required



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.

Within the field of Systems Engineering, there are 6 doctoral supervisors. According to the internal evaluation report of these 3, so it results a percentage of 50% equal to the minimum imposed by the criterion. As the scores proving the situation presented in Annex 322 were not presented, clarifications were requested from the hosts.

Recommendations. No further actions are required



Domain B. EDUCATIONAL EFFECTIVENESS

IOSUD from the Petroleum-Gas University of Ploieşti proves a good educational effectiveness, which allows the development of doctoral studies in appropriate quality conditions.

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

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.

IOSUD from the Petroleum-Gas University of Ploieşti proves in the case of Systems Engineering that it can attract candidates from outside the higher education institution.

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 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.

According to the internal evaluation report, out of a total of 12 places financed from the budget for the period 2016-2020, 5 master's degree graduates from other institutions registered, so a ratio of 0.41, higher than the ratio of 0.2 established by criteria.

Recommendations. No further actions are required

The indicator is fulfilled

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

IOSUD from the Petroleum-Gas University of Ploieşti proves in the case of the field of Systems Engineering that it imposes quality standards within the admission, and the field is attractive considering the low dropout rate.



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.

Within UPG Ploieşti there is a Methodology for organizing and conducting the competition for admission to 2021 doctoral studies. As the report or on the institution's website did not mention the criteria for evaluating and selecting candidates for the positions offered by the doctoral supervisors, a clarification was requested. According to the hosts' response, a set of 10 evaluation and selection criteria in the field of Systems Engineering is used.

Recommendations: It is recommended that all evaluation and selection criteria be included in the admission methodology and be presented transparently on the IOSUD / Doctoral Schools website.

The indicator is fulfilled

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

According to the internal evaluation report and additional information provided during the visit, within the field of Systems Engineering of the 14 admitted candidates two doctoral students were expelled, so the examination rate is 14.28%.

Recommendations. No further actions are required

The indicator is fulfilled

Criterion B.2. The content of doctoral programs

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

The training program based on advanced university studies in the field of Systems Engineering is adequate to improve the research skills of doctoral students and to strengthen ethical behavior in science.

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



Performance Indicator B.2.1.1. 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.

According to the curriculum corresponding to the field of Systems Engineering, the curriculum includes at least three disciplines relevant for the training in scientific research of doctoral students. In the curriculum there is the discipline Experimental data processing, a discipline included in the category of complementary disciplines.

Recommendations. No further actions are required

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.

According to the curriculum of the advanced study program corresponding to the field of Systems Engineering, the curriculum includes the discipline of Ethics and Academic Integrity, with a content corresponding to the criteria.

Recommendations. No further actions are required

The indicator is fulfilled

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

IOSUD UPG Ploiești an internal mechanism through which study programs are initiated, approved, monitored and evaluated, including doctoral programs.

Recommendations. No further actions are required

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.



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

The general operating report of these steering committees was presented in the internal evaluation report. At the request of the evaluation committee, the hosts included in Annex 4s evidence of the functionality of the steering committees.

Recommendations. No further actions are required

The indicator is fulfilled

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

In order to assess the criterion correctly, a clarification was requested from the committee. According to the answer received, for the 12 existing doctoral students within the steering commissions there are 15 teachers. Which makes the ratio 12:15 = 0.8, less than the maximum value set by the criterion.

Recommendations. No further actions are required

The indicator is fulfilled

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

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

In the case of Systems Engineering at the University of Petroleum-Gas in Ploieşti, the research is capitalized by doctoral students through presentations at scientific conferences and scientific publications.

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.

Papers have been made available to the committee. All evaluated papers present significant contributions in the field of Systems Engineering.



Recommendations. No further actions are required

The indicator is fulfilled

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

According to the internal evaluation report, the doctoral students who completed their doctoral studies in the evaluated period, 7, gave 16 presentations at international events. Consequently, the ratio is 16: 7, higher than the limit imposed by the criterion.

Recommendations. No further actions are required

The indicator is fulfilled

Standard B.3.2. The Doctoral School engages a significant number of external scientific specialists in the commissions for public defense of doctoral theses in the analyzed domain.

The Doctoral School appeals for the field of Systems Engineering to a significant number of external scientific references in the commissions for public defense of doctoral theses for the analyzed field.

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.

According to the internal evaluation report, in the period under evaluation there were no situations in which a referent from a higher education institution, other than the evaluated IOSUD, was included in more than one public support commission.

Recommendations. No further actions are required

The indicator is fulfilled

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



study domains in which minimum ten doctoral theses have been presented within the past five years should be analyzed.

The number of doctoral theses defended in the field of Systems Engineering in the last five years is 7. The maximum ratio is not calculated.

Recommendations. No further actions are required



Domain C. QUALITY MANAGEMENT

IOSUD from the Petroleum-Gas University of Ploieşti proves a good quality management, which allows the development of doctoral studies in appropriate quality conditions.

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

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.

IOSUD from the Petroleum-Gas University of Ploieşti has the institutional framework created for internal quality assurance.

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

- (a) the scientific work of Doctoral advisors;
- (b) the infrastructure and logistics necessary to carry out the research activity;
- (c) the procedures and subsequent rules based on which doctoral studies are organized;
- d) the scientific activity of doctoral students;
- e) the training program based on advanced academic studies of doctoral students;

f) social and academic services (including for participation at different events, publishing papers etc.) and counselling made available to doctoral students.

The UPG Ploiești Doctoral School has specific procedures that prove the constant development of the process of evaluation and internal quality assurance.

Recommendations. No further actions are required

The indicator is fulfilled

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



At the level of the UPG Ploieşti Doctoral School, evaluation mechanisms are implemented that aim at identifying the needs of doctoral students. Thus, there is an elaborated procedure for evaluating customer satisfaction, the doctoral students completing a questionnaire in this regard. In order to prove the application of this procedure, a clarification was requested. The answer includes questionnaires completed by doctoral students.

Recommendations: It is recommended to develop a measure plan focused on the needs of students following the questionnaires of needs and satisfaction and its public presentation.

The indicator is fulfilled

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

IOSUD from the Petroleum-Gas University of Ploieşti proves transparency in the presentation of information and accessibility to learning resources.

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

IOSUD from the Petroleum-Gas University of Ploieşti offers for consultation in electronic format the information of interest for doctoral students, future candidates, respectively the information of public interest.

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.



From the internal evaluation report it results that are published on the UPG Ploieşti website, the information regarding all aspectes of the doctoral studies.:

Recommendations: Ensuring all relevant pages in English as well, especially if they aim to attract students from abroad and improving the appearance.

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.

PhD students have access to the resources necessary to carry out doctoral studies in good conditions.

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.

According to the internal evaluation report, all doctoral students have access to international databases specific to the field of activity on any computer of UPG Ploieşti, offered through the ANELIS Plus program. Thus, doctoral students have access to the following databases with publications relevant to the field: SCOPUS, Science Direct, Web of Science, Springer, Wiley.

Recommendations. No further actions are required

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.

According to the internal evaluation report, UPG Ploieşti offers access twice during the doctoral studies, with the consent of the doctoral supervisor, to the similarity verification software: SISTEMANTIPLAGIAT.RO.

Recommendations. No further actions are required

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.



According to the internal evaluation report, in UPG Ploieşti doctoral students have unrestricted access to all the infrastructure available in the university, regardless of its administrator (Art. 11 and 14 of the Regulation on the organization and development of doctoral studies at the University of Oil and Gas in Ploieşti, available online).

Recommendations. No further actions are required

The indicator is fulfilled

Criterion C.3. Internationalization

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

The Doctoral School of the Petroleum-Gas University of Ploieşti proves internationalization, the situation can be substantially improved by adopting an internationalization plan with clear and specific measures that will be part of the mission of doctoral studies.

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

For the field of Systems Engineering, IOSUD has concluded agreements with 4 foreign institutions. The internal evaluation report included the internships of doctoral students both abroad and in the country. Travel to institutions in the country took place at companies, so they can not be included in the evaluation of the criterion. Consequently, clarifications were requested. According to this, out of the 7 doctoral students who completed the thesis during the evaluation period, a number of 3 doctoral students performed a form of mobility. Consequently, the ratio calculated considering the doctoral students who completed the thesis during the thesis during the evaluation period is: 3/7 = 0.42, higher than the minimum value specified in the criterion.

Recommendations: Adopt clear and effective measures to encourage doctoral students to carry out at least one mobility within the doctoral internship.



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.

No evidence was presented in the internal evaluation report that the organization of doctorates in international co-supervision is supported, including financially.

Within the internal evaluation report, lectures organized within UPG Ploieşti were mentioned, being presented links of these presentations, without specifying which of them refers to the field of Systems Engineering. According to the additional information requested by the evaluation commission, a series of lectures were indicated at which the doctoral students had the opportunity to hear first-rate experts, however without mentioning which of these lectures were organized by UPG Ploieşti.

Recommendations: Encouraging doctoral supervisors to write doctoral theses in international co-supervision. Establish a plan for the promotion of presentations in the field of Systems Engineering by international experts.

The indicator is partially 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.).

This indicator was not directly addressed in the internal evaluation report. However, the educational fairs in which UPG Ploieşti participated for the promotion of the educational offer were indicated. Additional information was requested by the evaluation commission. There it is mentioned two international students who during the evaluation period defended the thesis within UPG Ploieşti.

Recommendations: No further actions are required

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IV. SWOT Analysis

Strengths:	Weaknesses:
 PhD supervisors prove a good research activity; The research infrastructure corresponds to the assumed mission and objectives; Attracting international doctoral students on research topics related to the local specific. 	 Insufficient funding from the total amounts collected by the university related to doctoral grants or tuition fees; Lack of additional funding compared to government funding; Lack of mechanisms to effectively encourage doctorates in co-supervision and to invite international experts for lectures in the field
 Opportunities: The quality of doctoral supervisors and the local specifics of the research topics approached allow obtaining a high degree of internationalization; The topicality of the doctoral field allows attracting a significant number of candidates. 	 <u>Threats:</u> According to the documents provided during the visit, starting with October 1, 2021, the field of Systems Engineering no longer benefits from the full fulfillment of criterion A3.1.2. Lack of consistent funding with possible implications on access to the facilities required for the doctoral thesis adopted, especially in a leading field such as Systems Engineering.



V. Overview of judgments awarded and of the recommendations

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
1.	PI	 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 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 indicator is fulfilled	It is recommended that all decisions of the Doctoral School Board be posted on the school's website, and some pages should be translated into English. Continuing the effort of constantly updating the website of the Doctoral School so that both doctoral supervisors and doctoral students or candidates for admission can find all the necessary information
2.	PI	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 indicator is fulfilled	No further actions are required
3.	PI	A.1.2.1. The existence and effectiveness of an appropriate IT system to keep track of doctoral students and their academic background.	The indicator is fulfilled	No further actions are required
4.	PI	A.1.2.2. The existence and use of an appropriate software program and evidence of its use to verify the percentage of similarity in all doctoral theses.	The indicator is fulfilled	No further actions are required



No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
5.	IP	A.1.3.1. Existence of at least one research or institutional / human resources development grant under implementation at the time of submission of the internal evaluation file, per doctoral study domain under evaluation, or existence of at least 2 research or institutional development / human resources grant for the doctoral study domain, obtained by doctoral thesis advisors operating in the evaluated domain within the past 5 years. The grants address relevant themes for the respective domain and, as a rule, are engaging doctoral students.	The indicator is fulfilled	It is recommended to constantly update the list of national and international research grants. It is recommended to expand public-private partnerships with innovation-oriented companies in the field of Systems Engineering.
6.	PI *	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%.	The indicator is partially fulfilled	It is recommended to attract the private environment for granting scholarships for at least six months for doctoral students or to obtain grants for additional support for doctoral students.
7.	PI *	A.1.3.3. At least 10% of the total amount of doctoral grants obtained by the university through institutional contracts and of tuition fees collected from the doctoral students enrolled in the paid tuition system is used to reimburse professional training expenses of doctoral students (attending conferences, summer schools, training, programs abroad, publication of specialty papers or other specific forms of dissemination etc.).	The indicator is partially fulfilled	Establish a consistent annual amount to be allocated for each doctoral student from the total doctoral grants and tuition fees and to be made available to the doctoral student to be spent, according to the legal regulations in force, in the interest of completing the doctoral thesis.
8.	CPI	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	The indicator is fulfilled	No further actions are required



No.	Type of	Performance indicator	Judgment	Recommendations
	indicator (PI, PI *,			
	CPI)			
		developed within the past 5 years will be presented distinctly		
9.	CPI	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 indicator is fulfilled	No further actions are required
10.	PI *	A.3.1.2. At least 50% of all doctoral advisors have a full-time employment contract for an indefinite period with the IOSUD.	The indicator is fulfilled	No further actions are required
11.	PI	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 indicator is fulfilled	No further actions are required
12.	PI *	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 does not exceed 20%.	The indicator is fulfilled	No further actions are required
13.	CPI	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	The indicator is fulfilled	No further actions are required



No.	Type of	Performance indicator	Judgment	Recommendations
	indicator		-	
	(PI, PI *, CPI)			
	CPI)	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		
14.	PI *	A.3.2.2. At least 50% of the doctoral thesis	The	No further actions are required
		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	indicator is fulfilled	
15.	PI *	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 ast 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 indicator is fulfilled	No further actions are required
16.	PI *	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.	The indicator is fulfilled	It is recommended that all evaluation and selection criteria be included in the admission methodology and be presented transparently on the IOSUD / Doctoral Schools website.



No.	Type of	Performance indicator	Judgment	Recommendations
	indicator (PI, PI *, CPI)			
		Interviewing the candidate is compulsory, as part of the admission procedure.		
17.	PI	B.1.2.2. The expelling rate, including renouncement / dropping out of doctoral students 3, respectively 4, years after admission does not exceed 30%.	The indicator is fulfilled	No further actions are required
18.	PI	B.2.1.1. The training program based on advanced academic studies includes at least 3 disciplines relevant to the scientific research training of doctoral students; at least one of these disciplines is intended to study in-depth the research methodology and/or the statistical data processing.	The indicator is fulfilled	No further actions are required
19.	PI	B.2.1.2. At least one discipline is dedicated to Ethics and Intellectual Property in scientific research or there are well-defined topics on these subjects within a discipline taught in the doctoral program.	The indicator is fulfilled	No further actions are required
20.	PI	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.	The indicator is fulfilled	No further actions are required
21.	PI	B.2.1.4. All along the duration of the doctoral training, doctoral students in the domain receive counselling/guidance from functional guidance commissions, which is reflected in written guidance and feedback or regular meeting.	The indicator is fulfilled	No further actions are required
22.	CPI	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.	The indicator is fulfilled	No further actions are required
23.	СРІ	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	The indicator is fulfilled	No further actions are required



No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		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		
24.	PI *	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.	The indicator is fulfilled	No further actions are required
25.	PI *	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.	The indicator is fulfilled	No further actions are required
26.	PI *	B.3.2.2. The ratio between the doctoral theses allocated to one scientific specialist coming from a higher education institution, other than the institution where the defense on the doctoral thesis is organized, and the number of doctoral theses presented in the same doctoral study domain in the doctoral school should not exceed 0.3, considering the past five years. Only those doctoral study domains in which minimum ten doctoral theses have been presented within the past five years should be analyzed.	The indicator is fulfilled	No further actions are required
27.	PI	 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; 	The indicator is fulfilled	No further actions are required



No.	Type of	Performance indicator	Judgment	Recommendations
	indicator (PI, PI *,			
	CPI)	 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. 		
28.	PI *	C.1.1.2. Mechanisms are implemented during the stage of the doctoral study program to enable feedback from doctoral students allowing to identify their needs, as well as their overall level of satisfaction with the doctoral study program in order to ensure continuous improvement of the academic and administrative processes. Following the analysis of the results, there is evidence that an action plan was drafted and implemented.	The indicator is fulfilled	It is recommended to develop a measure plan focused on the needs of students following the questionnaires of needs and satisfaction and its public presentation.
29.	CPI	 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 indicator is fulfilled	Ensuring all relevant pages in English as well, especially if they aim to attract students from abroad and improving the appearance.



No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
30.	PI	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.	The indicator is fulfilled	No further actions are required
31.	PI	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.	The indicator is fulfilled	No further actions are required
32.	PI	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.	The indicator is fulfilled	No further actions are required
33.	PI *	C.3.1.1. IOSUD, for every evaluated domain, has concluded mobility agreements with universities abroad, with research institutes, with companies working in the field of study, aimed at the mobility of doctoral students and academic staff (e.g., ERASMUS agreements for the doctoral studies). At least 35% of the doctoral students have completed a training course abroad or other mobility forms such as attending international scientific conferences. IOSUD drafts and applies policies and measures aiming at increasing the number of doctoral students participating at mobility periods abroad, up to at least 20%, which is the target at the level of the European Higher Education Area.	The indicator is fulfilled	Adopt clear and effective measures to encourage doctoral students to carry out at least one mobility within the doctoral internship.
34.	PI	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.	The indicator is partially fulfilled.	Encouraging doctoral supervisors to write doctoral theses in international co-supervision. Establish a plan for the promotion of presentations in the field of Systems Engineering by international experts.
35.	PI	C.3.1.3. The internationalization of activities carried out during the doctoral studies is supported by IOSUD through concrete measures (e.g., by participating in educational fairs to attract international doctoral students; by including international experts in guidance committees or doctoral committees etc.).	The indicator is fulfilled	No further actions are required

ARACIS W. Conclusions and general recommendations

The doctoral studies in the field of Systems Engineering within the Doctoral School / IOSUD - University of Oil = Gas from Ploieşti generally benefit from an institutional capacity, institutional efficiency and quality management that allow it to be carried out at a high level. This level is mainly due to the quality of doctoral supervisors, but also to the existing research infrastructure. Thus, there is a great development potential for internationalization and connection with other institutions outside Romania, especially taking into account the specificity of the research topics addressed. This potential must be developed by adopting measures to encourage international cooperation. The completed doctoral theses are of quality, aspect highlighted and by the quality of the generated publications.

The recommendations proposed by the commission were made to preserve and improve the quality of doctoral studies in the field of Systems Engineering:

In view of the self-assessment report, the documents provided in addition to the commission's request, the results of the online meetings, the result of the questionnaire applied to doctoral students and the visit to the hosts, the consensus evaluation commission found that 32 indicators are met at the time of the visit and 3 indicators are partially met.



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.