Annex No. 3

The External Evaluation Report of the Chemistry Doctoral Study Domain
Gheorghe Asachi Technical University of Iaşi

Preliminary report by
International Expert Jordi Villà-Freixa
September 16th 2021

I. Introduction[1]

The report shows the details and conclusions obtained by the International Expert during the online evaluation of the Chemistry domain. The online meetings took place during the week September 13-17th 2021 with the schedule shown in Annex VII.1. The report is also strongly based on the information provided in the self evaluation report (SER) and its annexes, but modulated by the discussions during the online visit.

The expert's committee was composed by:

- Prof. Catinca Secuianu substituted the initially appointed Prof. Ionel Ciucanu, as the coordinator of the evaluation panel.
- PhD student Andrei Stan.
- Prof. Jordi Villà-Freixa, international expert.

I.1 The doctoral studies at Gheorghe Asachi Technical University of Iaşi

The University

"Gheorghe Asachi" Technical University of Iaşi (TUIASI) is an accredited state institution of higher education and advanced research, established in 1937, functioning since then under different denominations, being 1993 the year in which the current denomination was set (Annex 1.2. Government Decision no. 209 of May 17 1993_ TUIASI). TUIASI is a university of advanced research and education whose mission is to carry out specific activities of creation, innovative valorization of knowledge and its transfer to society in the fundamental areas of Engineering Sciences, Architecture and Urban Planning, as well as in interdisciplinary and complementary fields, in the local community, at the regional, national and international levels (according to its claimed mission and objectives: Annex 1.4. The university's mission and objectives).

Starting in 2005, the educational system is organized according to the Bologna principles, as follows: undergraduate programmes (4 years for engineers and 6 years of integrated studies for architects), master's programmes (2 years), PhD programmes with a pronounced applicative and research character, with a duration of 3 years, post-doctoral programmes and post-graduate lifelong training courses.

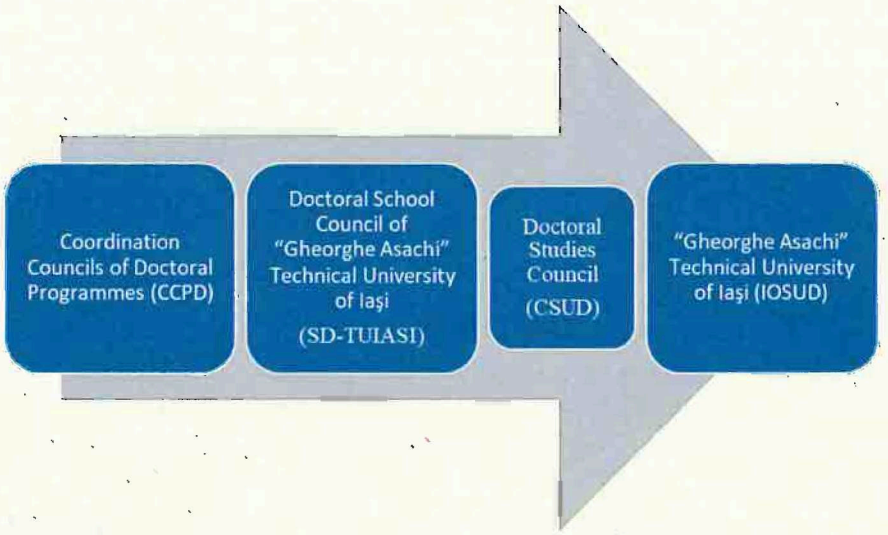
Currently, TUIASI comprises 11 faculties, 24 research/excellence centres holding CNCSIS accreditation (Table 3 in the SER), and 7 research teams at faculty level (Table 4 in the SER), as well as successful high-performance laboratories focusing on scientific research, the creation and transfer of knowledge. An example of such transfer is the fact stated in the SER that 65% of patents in Romania in the past 15 years correspond to work carried out at TUIASI.

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

TUIASI has been positive evaluated or accredited both at the national (NRAE) and international (IEP-EUA) and it is reasonably well positined in university rankings.

The Doctoral School

Senate decision no. 347/October 27 2017 established the reorganization of the doctoral studies by merging all previous ten doctoral schools (at the level of the faculties) into a single one. After the validation of elections for the position of Doctoral School Director and the members of the Doctoral School Council by the TUIASI Senate on March 30, 2018, the Doctoral School started to function.



The Doctoral School (SD-TUIASI) coordinates the activity of ten Coordination Councils of Doctoral Programmes (CCPD), and organises doctoral studies in the following areas, roughly corresponding to the different faculties:

1. *Chemistry, Environmental Engineering,* at "Cristofor Simionescu" Faculty of Chemical Engineering and Environmental Protection;
2. *Chemical Engineering,* at the "Cristofor Simionescu" Faculty of Chemical Engineering and Environmental Protection and the Faculty of Industrial Design and Business Management;
3. *Mechanical engineering,* at the Faculty of Mechanics and the Faculty of Machine Manufacturing and Industrial Management;
4. *Electrical engineering; Energy engineering,* at the Faculty of Electrical Engineering, Energetics and Applied Informatics;
5. *Electronic engineering, telecommunications and information technologies,* at the Faculty of Electronics, Telecommunications and Information Technology;
6. *Computer engineering and information technology; system engineering;* at the Faculty of Automatic Control and Computer Engineering;
7. *Industrial engineering,* at the Faculty of Machine Manufacturing and Industrial Management and the Faculty of Industrial Design and Business Management;
8. *Civil engineering and Building Services*, at the Faculty of Civil Engineering and Building Services and The Faculty of Hydrotechnics, Geodesy and Environmental Engineering;

9. *Materials engineering,* at the Faculty of Materials Science and Engineering, "Cristofor Simionescu" Faculty of Chemical Engineering and Environmental Protection and the Faculty of Mechanics.
10. *Engineering and management,* at the Faculty of Industrial Design and Business Management.

According to the SER, SD-TUIASI has the following main direction in scientific research:

- Promoting excellence in research;
- The constant development of the research infrastructure through the modernization of existing equipment and the acquisition of new equipment that can sustain research at the university level, as well as support collaboration with other national or international institutions;
- Developing and accrediting new research areas within SD-TUIASI;
- Encouraging PhD students to publish in well-ranked journals in each area of study;
- Establishing sustainable partnerships with the economic agents in different national and international research projects;
- Solving, by working together with the economic agents, the different research topics which result in both collaborations under various forms, as well as PhD theses with the clear definition of intellectual and industrial property;
- Strengthening international cooperation by signing new collaboration protocols within SD-TUIASI;
- Promoting and supporting its own high-quality publications open to contributions the country and abroad.
- The periodic evaluation of the results of scientific research within SD-TUIASI.

SD-TUIASI has gone through several rounds of evaluation and accreditation, obtaining "high level of confidence" certificates by the ARACIS council.

In terms of quality assurance (QA), the SD-TUIASI claims that the following measures are taken into consideration (as stated in the SER):

- Promoting science in the spirit of European values, democracy and academic freedom, moral values, openness and integration in the international scientific community, as well as in the spirit of the European culture and civilization;
- Increasing the quality of research through: signing as many joint supervision agreements with prestigious universities and institutes abroad; the continuous update of the research infrastructure;
- Signing collaboration agreements with institutions of higher education, research institutes, research networks for the joint exploitation of the various research infrastructures;
- Harmonizing the advanced programmes of study with those of similar universities home and abroad;
- The accreditation of new doctoral areas with a major impact on research activities;
- Making good use of the opportunities provided by the European programmes (ERASMUS) with a view to PhD student exchanges for the improvement of research methods and the increase in research quality and responsibility;

- Drawing master's graduates towards doctoral studies by organizing informative activities on the advanced studies programme, on the place and role of the holder of a PhD degree in technical sciences in modern society as well as on the study and living offered by the university;
- The enrolment of as many foreign students as possible in the area of doctoral studies at the TUIASI Doctoral School;
- The initiation and development of high-performing scientific research programmes through collaboration with internal and external partners;
- Stimulating interdisciplinary research on top technologies or that constitute national or international priorities;
- Organizing national and international scientific, workshops or conferences within the Doctoral School with the purpose of disseminating the results of scientific research;
- Constantly elevating the scientific level of the papers published by PhD students in the *Bulletin of the Polytechnic Institute of Yassy*;

The specific measures to promote professional ethics and deontology are based on academic freedom, competence and professionalism, honesty, integrity, responsibility and fellowship:

- The compulsory ethics class for all first-year PhD students;
- The information sent to PhD students by all PhD advisors regarding ethics and deontology in their research;
- The information sent to PhD students by all PhD advisors regarding research objectives, the writing of scientific papers and of the PhD thesis.

I.2 Doctoral studies in the area of Chemistry

The doctoral activity in the area of Chemistry takes place within the "Cristofor Simionescu" Faculty of Chemical engineering and Environmental Protection, with the Mission: "to develop highly specialised human resources for research, development and innovation, able to design and develop specific processes, products and services, in technically, economically and ecologically feasible ways, as well as to join the highly qualified labour market, by ensuring a creative, deontological and adequate framework for academic studies, advanced scientific research, interdisciplinary approaches and the promotion of scientific collaborations at a national and an international level."

The SER states the program has a dual education and research orientation.

The Doctoral advisors in the area of Chemistry are:

- Professor Nicolae Hurduc, PhD, eng
- Professor Geta David, PhD, eng
- Professor Daniel Mircea Sutiman, PhD, eng
- Professor Gabriela Margareta Ciobanu, PhD, chemist
- Professor Emeritus Marcel Ionel Popa, PhD, eng
- Professor Emeritus Dan Scutaru, PhD, eng

And the research lines are:

- *Inorganic chemistry* (bioinorganic chemistry and chemical catalysis, coordinative chemistry, synthesis, kinetics and reaction mechanisms, nanostructured materials chemistry, organometallic compound chemistry)
- *Materials* (synthesis, biomaterials, materials with applications in electronics, nanomaterials, polymers, characterisation, solid-state chemistry, surface phenomena, thin films)
- *Organic chemistry* (organic and pharmaceutical synthesis, asymmetric catalysis, combinatorial chemistry, bioconjugate chemistry, bioorganic chemistry, biosynthesis, reaction mechanisms, natural products chemistry, organometallic chemistry)
- *Physical chemistry* (structural characterisation of materials, laser spectroscopy, molecular clusters, polymers, quantum theory of molecular electronic structure, dynamics of reactions, NMR spectroscopy, statistical mechanics, ultrafast spectroscopy)

The research is carried out in individual laboratories:

- Laboratory of thermal analysis,
- Laboratory of rheological studies,
- Laboratory of polymeric biomaterials,
- Laboratory of molecular modelling, simulation of synthesis properties and characterisation of polymers,
- Laboratory of fine organic syntheses & Laboratory of spectral analysis and surface properties,
- Laboratory of natural polymers,
- Laboratory for the complex and integrated treatment of biomass,
- Laboratory of biochemical engineering and biotechnology,
- Applications of Artificial Intelligence,
- Laboratory of catalysis research,
- Laboratory of nanoarchitectonic materials,

as well as in laboratories integrated in the **The Research Centre POLYMERS** (CNCSIS certified research platform) (Coordinator: Professor Nicolae HURDUC, PhD, eng.) (http://erris.gov.ro/Centrul-de-Cercetare-POLIMER)

II. Methods used

The evaluation panel for the Chemistry Domain participated in all online meetings organized by the commission at the TUIASI. This report is ground on the information gathered in those meetings as well as in the information provided in the self evaluation report (SER), which is very complete and allows for the comparison of the different fields within the doctoral school.

Many of the limitations detected in the evaluation report may be corrected by further promoting openness of the organization in terms of international and industrial relationships.

As stated by the schedule in Section VII. 1. Detailed schedule of the visit the meetings were organized by the commission with the several stakeholders of the chemistry doctoral study domain:

1) doctoral students and graduates,
2) school officials,
3) doctoral advisors,
4) representatives of the Council of the Doctoral School, the Quality Assessment and Assurance Commission, the Quality Assurance Department, the Ethics Commission
5) employers

III. Analysis of ARACIS's performance indicators

Domain A. INSTITUTIONAL CAPACITY

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.

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.

Description

As detailed in the SER, specific regulations within IODS and the Doctoral School are published on the site of TUIASI (www.doctorat.tuiasi.ro). Details are given in Annex 2.1 of the provided documentation.

Analysis

Based on the facts and after the online meetings, it was made clear that the Chemistry Domain is embedded in a working Doctoral School with the proper regulatory framework.

Recommendations

The indicator is fulfilled

Performance Indicator A.1.1.2.

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

Description

According to the SER, the Regulation of the Doctoral School includes under:

- art. 13: specific references to the way new members who are doctoral advisors are accepted;
- art. 10, 11: references to the mechanisms by means of which the decisions regarding the content of the training programme are made;
- art. 14, 15, 16 in the regulation of DSC with references to the procedures for the doctoral advisor's replacement;
- art. 22, 23, 24, 25 in the regulation of DSC with references to the conditions under which the PhD programme can be interrupted;
- art. 32 in the regulation of DSC with references to the modalities to prevent fraud;
- art. 21 in the regulation of DSC and art. 15 in the regulation of DSC with references to the way access to research resources is ensured;
- the methodology regarding attendance obligations in accordance with a methodology elaborated by the Ministry of Education was not issued.

Details and links to these regulations are presented in Annex 2.2. of the provided documentation.

Analysis

The regulatory framework is clear and the university complies with the requirements.

Recommendations

The indicator is fulfilled

Standard A.1.2.

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

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

The Doctoral School keeps the doctoral students' record by its own IT system consisting of a database, and by means of the Unique Matriculation Register (UMR).

Analysis

The requirements based on the Ministry Order for Doctoral Studies are accomplished in terms of the IT system.

Recommendations

The indicator is fulfilled

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

Description

Plagiarism Detector application is used (http://www.plagiarism-detector.com/c/en/index.php) on the basis of a contract concluded between TUIASI and Plagiat-Sistem Antiplagiat prin Internet SRL.

Analysis

The anti plagiarism tools are in place and are used effectively.

Recommendations

The indicator is fulfilled

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

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

The doctoral advisors in the doctoral area of study Chemistry have obtained 2 research or institutional/human resources development grants within the last 5 years.

Analysis

The competitiveness of the Domain supervisors is clear and they have been active in finding external sources of funding to support their research and the research of their PhD students.

Recommendations

The indicator is fulfilled

Performance Indicator *A.1.3.2.

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

Description

On 10.09.2020, there existed 11 active Doctoral students, of which 4 got research grants (21%).

Analysis

Although the indicator has a lot of margin for improvement, the trend is good.

Recommendations

The indicator is fulfilled

Performance Indicator *A.1.3.3.[2]

At least 10% of the total amount of doctoral grants obtained by the university through institutional contracts and of tuition fees collected from the doctoral students enrolled 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.).

Description

According to the information provided in the Ser and its annexes, the percentage of the total amount of grants that is reimbursed for professional training is 3.9%.

Analysis

[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.

From the data provided it seems clear that such reimbursement is just fulfiled. Additional efforts should be put in place to ensure the training of the PhD students.

Recommendations

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.

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

According to the information provided during the visit, the learning spaces and the material equipment of the Doctoral School allow for research activities in the area of Chemistry to take place, in accordance with the targeted mission and objectives. The material equipment includes computers, specific software, equipment, laboratory equipment, library, access to international databases, etc. The research infrastructure and the research services offer are presented publicly by the platform ERRIS. The research infrastructure purchased and developed over the past 5 years is presented in detail in the SER Annex 2.8.

Analysis

The field of doctoral studies of Chemistry has at its disposal sufficient infrastructure to conduct its research and development activities.

Recommendations

The indicator is fulfilled.

Criterion A.3. Quality of Human Resources

Standard A.3.1.

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

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

Within the doctoral area of study, there are 6 doctoral advisors and 4 meet the NCAUTDC minimal standards that are required and compulsory in order to obtain the habilitation qualification (66%).

Analysis

The indicator is clearly fulfilled.

Recommendations

The indicator is fulfilled

Performance Indicator *A.3.1.2.

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

Description

The total number of doctoral advisors in the doctoral area of study Chemistry is 6, and the tenured doctoral advisors in the area is 4 (66%).

Analysis

Clear fulfilment.

Recommendations

The indicator is fulfilled

Performance Indicator A.3.1.3.

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

Description

According to the SER, the subjects in the education programme based on advanced higher education studies corresponding to the area Chemistry are delivered by Prof. Maria Gavrilescu, Prof. Nicolae Seghedin, Prof. Carmen Teodosiu, lecturers holding the title of professor or associate professor, with expertise in the area of the subjects they teach within the evaluated area, according to the Curricula available online at: http://www.doctorat.tuiasi.ro/Htm/Planuri%20invatama nt.htm

Analysis

The criteria is clearly fulfilled.

Recommendations

The indicator is fulfilled

Performance Indicator *A.3.1.4.

The percentage of doctoral thesis advisors who concomitantly coordinate more than 8 doctoral students, but no more than 12, who are themselves studying in doctoral programs[3] does not exceed 20%.

Description

All 6 doctoral advisors supervise less than 8 thesis.

Analysis

The indicator is clearly fulfilled.

Recommendations

The indicator is fulfilled

Standard A.3.2.

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

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

[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.

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.

Description

The number of doctoral advisors in the area who have no less than 5 Web of Science-indexed or ERIH-indexed publications in journals with an impact factor is 6. The number of doctoral advisors in the area who are members in the scientific or organising boards of international conferences within the past 5 years is 4.

Analysis

Doctoral supervisors have publications indexed in the Web of Science, with impact factor, and other achievements, relevant to the Field of Chemistry.

Recommendations

The indicator is fulfilled.

Performance Indicator *A.3.2.2.

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

Description

The number of doctoral advisors in the area of study who are still active in their scientific field, obtaining, on the basis of scientific results within the past 5 years, more than 25% of the score requested by NCAUTDC minimal standards in order to obtain the habilitation qualification (100%) is 3, which corresponds to 50% of the total.

Analysis

The indicator can be better, but it fullfills the requirements.

Recommendations

The indicator is fulfilled.

Domain B. EDUCATIONAL EFFECTIVENESS

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.

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

In the past five years, there have been 21 budget-funded places in the area of study. During this time, a number of 7 graduates from other institutions registered for the admission exam, corresponding to 33% of the total.

Analysis

The ratio is satisfied. However, we learned from the discussions that to accomplish for this indicator is not simple, as the amount of funded places for the PhD is very limited. This involves the doctoral school sometimes has to reject applications in order to comply with the indicator. The solution to this is, of course, increasing thenumber of budgetted places. Although this is not something easy to solve, we strongly encourage the university to push for the increase of the budget for PhD students.

Recommendations

The indicator is fulfilled

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

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

Description

Following the information provided in the SER and with details in the SER Annex 2.16a), admission to doctoral studies programs in the area of Chemistry is conducted according to selection criteria that include academic, research and professional merit, interest in scientific or artistic/sports research, publications in the field and a research proposal. In addition, an interview with the applicant is a compulsory part of the admission procedure.

Analysis

The procedure for selecting new PhD students is clear, follows, in general, the OTM-R principles.

Recommendations

The indicator is fulfilled

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

Description

5 students have been expelled, over a total of 17, in the period 2015-2019, yielding a dropping ate of 29.4%

Analysis

The dropout rate is high, although in the alowed limits of the indicator. The university is encouraged to check the origin of such high value and to correct it in the future.

Recommendations

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.

[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.

Description

Three important subjects for the PhD students' education for scientific research and one subject dedicated research methods, according to recommendations, are included in the curricula (http://www.doctorat.tuiasi.ro/doc/Planuri%20invata mant/Planuri%20invatamant_2020-2021.pdf)

- Academic ethics and integrity
- Research methods (in-depth notions on research methodologies and/or the statistical processing of data)
- A specialised subject of the PhD advisor's choice, in collaboration with the PhD student.
- Individual study (as an optional subject, to be chosen by the CCPD)

Analysis

The indicator is clearly fulfilled.

Recommendations

The indicator is fulfilled

Performance Indicator B.2.1.2.

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

Description

Prof. Nicolae Seghedin and prof. Mariana Gavrilescu teach the subject "Academic Ethics and Integrity", as offered by the Doctoral School.

Analysis

The indicator is clearly fulfilled

Recommendations

The indicator is fulfilled

Performance Indicator B.2.1.3.

The IOSUD has mechanisms to ensure that the academic training program based on advanced university studies addresses „the learning outcomes", specifying the knowledge, skills, responsibility and autonomy that doctoral students should acquire after completing each discipline or through the research activities[5].

Description

The IODS established such mechanisms through the DSC, the DS regulations and the procedures drafted by DSC, where these skills are listed.

In addition to the basic procedures there exist also specific procedures that regulate the mechanisms by which the education programme based on advanced higher education studies associated with the evaluated area aim at learning outcomes, stating the knowledge, skills, duties and autonomy that PhD students should acquire after the completion of each subject or by conducting research.

Analysis

Chemistry doctoral students acquire professional and transversal competencies, and learning outcomes are clearly stated. The indicator is clearly fulfilled.

Recommendations

The indicator is fulfilled

Performance Indicator B.2.1.4.

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

Description

PhD students in the area of Chemistry benefit from the counselling/guidance of functional advisory committees, also reflected in guidance and opinions expressed in writing or during regular meetings. Details on how this is achieved were also obtaied during the on line interviews with the students.

Analysis

The perception from the visit is that, despite the relatively limited number of supervisors in the Chemistry domain, the students find suitable supervision and will fulfill the requirements of the PhD.

[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

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.

Description

The ratio between the number of doctoral students and the number of teaching staff/researchers providing doctoral guidance is 21/19= 1.1.

Analysis

The number of PhD students is not excessive for the size and shape of the teaching staff and researchers providing guidance to them. The structure of the Domain is balanced.

Recommendations

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.

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

In the past 5 years, 8 students completed the doctoral studies in the area of Chemistry. The list provided by TUIASI in Annex 2.21 includes 12 publications in the past 5 years in journals with impact factors within the range 0.8 to 6.2, couting several publications within the Q1. Among the articles, 7 of them have as first author the Phd student. Some articles are particularly highly cited, according to Google Sholar (articles 10 or 12, for example).

Analysis

Good contributions are shown by the students in the last 5 years, which implies a prominent positioning of the Chemistry program in the international research system.

Recommendations

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.

Description

The ratio of the 29 presentations vs the 8 students that finnished their doctoral studies in the past 5 years indicated the PI is fulfilled.

Analysis

The indicator is fulfilled, but a clear biass for national conferences is shown in annex 2.22. Among the international events, most are in France, showing a relatively small penetration in the international ecosuystem of the phd students. Efforts in this direction are encouraged, despite the indicator being fulfilled.

Recommendations

The indicator is fulfilled

Standard B.3.2.

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

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

The number of doctoral theses assigned to any one reviewer from an institution of higher education other than the evaluated IODS is not higher than two (2) for theses supervised by the same PhD advisor in one year, according to the documentation provided in Annex 2.23.

Analysis

The indicator is fulfilled

Recommendations

The indicator is fulfilled

Performance Indicator *B.3.2.2.

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

Description

Only 8 theses have been defended in the past fve years in this domain.

Analysis

It does not apply

Recommendations

The indicator does not apply

Domain C. QUALITY MANAGEMENT

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

Standard C.1.1.

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

Annex 2.25 lists several procedures that are in place to ensure points 1-f in the PI C.1.1.1.

Analysis

Based on the information provided, as well as the interviews carried out during the site visit, the QA system is in place. A culture of quality, evaluation and quality assurance in a process-based approach, based on the Quality Management System, which it is constantly improving, is established at TUIASI, in accordance with the requirements of European Standards and Guidelines for Quality Assurance (ESG).

Better quality enhancement procedures are encouraged, though, in order to ensure that not only checkbox listing of QA items is considered to guarantee the quality of the programs.

Recommendations

The indicator is fulfilled.

Performance Indicator *C.1.1.2.

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

Description

Since 2018, questionaries on satisfacion by the Phd students are being distributed and processeed.The questionnaires include questions on:

- The administrative services;
- The education programme based on advanced HE studies;
- Assessment and grading;
- Communication with the PhD advisor;
- Research infrastructure;
- The scientific relationship with the PhD advisor;
- The relationship with the DSC and DS;
- The need to implement various measures;
- Other criteria.

Analysis

The PhD feedback mechanisms are in place, but it would be good to analyze what are the indicators that the IOSUD uses to boost such continuous development of the administrative and academic services.

Recommendations

The indicator is fulfilled

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

Standard C.2.1.

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

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

All regulations and procedures published at the link below:

http://www.tuiasi.ro/rectorat/consiliul-pentru- studiile-universitare-de-doctorat

Analysis

Complete information is transparently provided in the website

Recommendations

The indicator is fulfilled

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

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

Description

According to the information provided in the SER, all PhD students have access to international databases particular to their area of study on any computer registered in the TUIASI network through the ANELIS (National Electronic Access to the Scientific Literature for Supporting the Research and Education System in Romania) contract. The databases provide access to: Web of Science, SCOPUS, Science Direct, IEEE, Springer etc.

Analysis

Good and standard online access to research oriented databases

Recommendations

The indicator is fulfilled

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

Description

According to the information provided in the SER (including the contracts in annex 2.29) TUIASI signed a contract of service with the 'Plagiat-Sistem Antiplagiat prin internet SRL' (Plagiarism- Anti-plagiarism System via the Internet LLC) company to check the degree of similarity. Each PhD student has access, upon request, through their PhD supervisor, to an electronic system to check the degree of similarity with other scientific works. Access is free for up to 50000 signs annually, anything exceeding this number requiring payment.

Analysis

Acces is guaranteed to students.

Recommendations

The indicator is fulfilled.

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

Description

The students have access to good research infrastructure.

Analysis

The infrastructure is correct for the size of the phD domain.

Recommendations

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.

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

According to the SER, the number of mobility agreements with foreign universities is 12, the total budget places in the 2015 – 2020 period is 21, and the number of PhD students with mobilities is 6. Thus, the mobility percentage is 28.5%.

The IODS develops and implements policies and action plans designed to increase of the number of PhD students participating in scholarships abroad to up to at least 20%, the target of the European Higher Education Area. Briefly, among these measures we can find:

- the development of the Erasmus programmes
- the partnership with the platform phd-hub.eu;
- the set-up of summer schools for PhD students;
- the introduction of the European PhD;
- encouraging participation in programmes of the COST type;

- posting international events dedicated to doctoral studies on the website, scholarships in the European and non-European areas.

Analysis

It is encouraged to take profit of the margin given to complete this indicator is order to improve the internationalization of the students.

Recommendations

The indicator is partially 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

There are currently 2 international supervision agreements, and 7 "first-ranked" experts held classes in front of the PhD students in the period 2016-2020.

Analysis

The level of internationalization of the study program is limited, as only relationships with specific partners abroad have been exploited. It appears that the university could take profit of the potential of their professors in order to improve this mobility and ensure cotutelles or similar relationships with universities abroad.

Recommendations

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.).

Description

The internationalisation of activities in the area of doctoral studies is also supported by other specific measures, such as:

- participation to educational fairs in order to attract international PhD students;
- the inclusion of international experts in advisory committees or PhD thesis defense committees;
- joint-supervision theses;
- participation in international PhD defense committees;
- the establishment of the European PhD;

- the inclusion of doctoral studies in specialised European networks etc.

Analysis

We strongly encourage analyzing in a critical way this item, producing a much more international oriented research and training for the PhD students, as this will definitely benefit the whole Domain.

Recommendations

The indicator is fulfilled

IV. SWOT Analysis

Strengths:	**Weaknesses:**
-well structured program -good research infrastructures -good supervisors in terms of publications and research resources	-lack of internationalization -apparently low impact of the research at the university within the regional development
Opportunities:	**Threats:**
-willing by the supervisors to demonstrate a good level of research and commitment to internationalization -the relationship with the industrial environment seems to be only opportunistic and may have a lot of possibilities of expansion	-a lack of ambition in internationalization will become problematic in terms of future success (and survival) of the domain

V. Overview of judgments awarded and of the recommendations

No.	Type of indicator (*, C)	Judgement	Recommendations
A.1.1.1		fulfilled	
A.1.1.2		fulfilled	
A.1.2.1		fulfilled	
A.1.2.2		fulfilled	
A.1.3.1		fulfilled	
A.1.3.2	*	fulfilled	

A.1.3.3	*	partially fulfilled	From the data provided it seems clear that such reimbursement is just fulfiled. Additional efforts should be put in place to ensure the training of the PhD students.
A.2.1.1	C	fulfilled	
A.3.1.1	C	fulfilled	
A.3.1.2	*	fulfilled	
A.3.1.3		fulfilled	
A.3.1.4	*	fulfilled	
A.3.2.1	C	fulfilled	
A.3.2.2	*	fulfilled	
B.1.1.1	*	fulfilled	
B.1.2.1	*	fulfilled	
B.1.2.2		fulfilled	
B.2.1.1		fulfilled	
B.2.1.2		fulfilled	
B.2.1.3		fulfilled	
B.2.1.4		fulfilled	
B.2.1.5	C	fulfilled	
B.3.1.1	C	fulfilled	
B.3.1.2	*	fulfilled	
B.3.2.1	*	fulfilled	
B.3.2.2	*	---	The indicator does not apply
C.1.1.1		fulfilled	
C.1.1.2		fulfilled	
C.2.1.1	C	fulfilled	
C.2.2.1		fulfilled	
C.2.2.2		fulfilled	
C.2.2.3		fulfilled	
C.3.1.1	*	partially fulfilled	It is encouraged to take profit of the margin given to complete this indicator is order to improve the internationalization of the students.
C.3.1.2		partially fulfilled	The level of internationalization of the study program is limited, as only relationships with specific partners abroad have been exploited. It appears that the university could take profit of the potential of their professors in order to improve this mobility and ensure cotutelles or similar relationships with universities abroad.
C.3.1.3		fulfilled	

VI. Conclusions and general recommendations

In general, the health of the Chemistry Domain at this Doctoral School is very good. The program is relatively small in terms of students and professors, but well structured, well balanced with all indicators in place and only minor corrections regarding internationalization. This is, only Section C.3 needs some special attention, as this evaluator found limited internationalization in the program, which does not match the potential and the good infrastructure of the labs. The organization is encouraged to push into Horizon Europe and similar international projects, in order to take profit of such opportunity and to position itself as a reference in the fields of major expertise of their professors. This will benefit both the program and the students.

The profile of the professors is good and very proactive to train students, but a balance should be made between the production of external indicators and the strategy of the institution to ensure it produces the best researchers and professionals in the chemistry field.

Overall, though, and based on the performance of the university related to the proposed indicators, the behaviour is good and only minor corrections are suggested

VII. Annexes

VII. 1. Detailed schedule of the visit

Date	time	*Activity*
September 8th	10:00-11:00	Meeting of panel members for discussing main methodological asects related to the evaluation of doctoral studies
September 13th	09:00-09:45	Online preliminary meeting for the preparation and harmonization of evaluation steps, in hybrid mode, of doctoral study domains and IOSUD
	10:00-10:45	Online meeting with representatives of the institution and of the Council for Academic Doctoral Studies (CSUD)
	11:00-12:00	Online meeting with the contact person for the doctoral study domain under review and the team who drafted the internal evaluation report
	12:15-13:15	Online meeting with the Directors/ persons in charge of the research centers/laboratories within the doctoral study domain
	13:30- 14:30	Online meeting with the academic staff corresponding to the doctoral study domain
September 14th	9:00-10:00	Online meeting with graduates for the Chemistry doctoral study domain
	10:15-11:15	Online meeting with PhD students
	11:30-12:30	Online meeting with Doctoral Schools Council (CSD members)
September 15th	9:00-11:00	Online meeting with the members of the Ethics Commission Online meeting with the Commission for Quality Evaluation and Assurance (CEAC) members / Quality Assurance Department
	11:15-12:15	Online meeting with employers of Doctoral graduates in the Chemistry domain
	12:30-13:30	Online technical meeting to identify speicfic issues that need to be clarified, if necessary, during the online visit
September 16th	9:00-18:00	Face-to-face working meetings, visiting the educational and research infrastructure
September 17th	11:00-11:45	Online meeting for conclusions
	12:00-13:00	Meeting with representatives of the institution under review to discuss on the conclusions of the evaluation process and the main recommendations