



External Evaluation Report (REE) for the procedure for evaluation of Doctoral School

Higher Education Institution/Education Provider Organization:	Technical University of Cluj-Napoca
Doctoral School:	Doctoral School of Technical University of Cluj-Napoca
Doctoral Domain:	Systems Engineering
The objective of the external evaluation:	Maintaining accreditation (MAC)

Members of the ARACIS Evaluation Panel

No.	Last Name and First Name	Team role	Signature
1.	Prof. Habil. Dr. Ing. Valentina Emilia Bălaș	Expert evaluator	
2.	Prof. Dr. Habil. Gabor Kiss	International Expert	
3.	Alexandra Bianca Racareanu	PhD Student Evaluator	

I. Introduction

The external evaluation report was drafted in the context of the procedure for maintaining the accreditation of the doctoral study domain Systems Engineering, organized by IOSUD - Technical University of Cluj-Napoca (UTCN), within the Doctoral School of Automation and Computer Science. The evaluation concerns the period 2021-2025 and is based on the internal evaluation report submitted by the institution, its supporting documents and annexes, supplementary clarifications requested by the ARACIS panel, and the external evaluation visit carried out on 4-5 June 2026. The ARACIS evaluation panel consisted of Prof. Habil. Dr. Ing. Valentina Emilia Bălaș, expert evaluator and chair of the panel, Prof. Dr. habil. Gabor Kiss, international expert evaluator, and Alexandra Bianca Racareanu, doctoral student evaluator.

The Technical University of Cluj-Napoca is an accredited public higher education institution, with legal personality, operating in the public interest and on a non-profit basis, as an integral part of the national higher education system. The Technical University operates in compliance with the Constitution and legislation of Romania and in accordance with the principles set forth in the Magna Charta Universitatum of Bologna (1999), of which it became a signatory in 2004.

The institution was established in 1948 under the name Institute of Mechanics (Official Gazette No. 249/26.10.1948). In 1953, it became the Polytechnic Institute of Cluj (Council of Ministers Decision No. 2688/1953), and since 1992, it has operated under its current name, the Technical University of Cluj-Napoca.

In 2012, a merger by absorption took place with the North University of Baia Mare, which continues to function as a complex organizational structure under the name North University Center of Baia Mare.

The headquarters of the university are located at: 28 Memorandumului Street, Postal Code 400114, Cluj-Napoca, Romania.

In addition to its campuses in Cluj-Napoca and Baia Mare, the educational activities of the Technical University of Cluj-Napoca are also carried out through university extensions in Zalău, Satu Mare, Bistrița, and Alba Iulia, which do not have independent legal personality.

The Technical University of Cluj-Napoca, a university of advanced research and education, part of the international academic community, offers Bachelor's, Master's, and Doctoral study programs that respond dynamically and efficiently to contemporary demands and the challenges of a competitive society. At the Technical University of Cluj-Napoca, a total of 88 Bachelor's degree programs are accredited or provisionally authorized, operating within 12 faculties (of which 9 are in Cluj-Napoca and 3 within the North University Center of Baia Mare). Bachelor's studies are organized over a period of 4 years in the case of engineering sciences (240 ECTS credits), 3 years (180 ECTS credits) at the Faculty of Letters and the Faculty of Science – North University Center of Baia Mare, and 6 years (360 ECTS credits) at the Faculty of Architecture.

The Master's degree cycle, within which 100 study programs operate, has a standard duration of two years, corresponding to 120 transferable study credits (ECTS), and culminates in Level 7 of the European Qualifications Framework (EQF) and the National Qualifications Framework.

In accordance with the current legal framework, UTCN is an Institution Organizing Doctoral University Studies (IOSUD).

From the perspective of its organizational structure, beginning in 2005, doctoral studies at the Technical University of Cluj-Napoca have been organized according to the Bologna system (third cycle of studies).

By University Senate Decision No. 323 of November 7, 2014, 10 doctoral schools were established within UTCN: Automation and Computer Engineering, Electrical Engineering, Electronics, Telecommunications and Information Technology, Mechanical Engineering and Mechatronics, Industrial Engineering and Management, Materials and Environmental Engineering, Civil Engineering and Building Services, Architecture and Urban Planning, Applied Sciences, and Humanities.

On December 5, 2017, the UTCN Administrative Council decided to reorganize the 10 doctoral schools into a single Doctoral School, a decision subsequently approved by the University Senate through Decision No. 856 of December 15, 2017. The former doctoral schools were reorganized into Councils for the Coordination of Doctoral Programs.

Through Order No. 5500/27.10.2021, published in Part I of the Official Gazette No. 1067/08.11.2021, the maintenance of accreditation for the organization of doctoral university study programs at UTCN was approved, both for UTCN in its capacity as an Institution Organizing Doctoral University Studies (IOSUD UTCN) and for the 14 doctoral study domains within the Doctoral School of UTCN.

Subsequently, three additional doctoral domains were introduced.

The Doctoral Study Domain of Systems Engineering operates as an accredited doctoral domain within the IOSUD of the Technical University of Cluj-Napoca, having a long-standing continuity in research activity and doctoral training. In the context of the current accreditation maintenance procedure, the evaluation of the domain's development is based on the changes that occurred during the 2021–2025 period, both in terms of infrastructure and resources and regarding the academic and institutional operational framework.

At the level of human resources, the number of doctoral supervisors has shown a positive development. While in 2021 the domain had 16 doctoral supervisors, by 2025 it operates with 19 supervisors, reflecting both new affiliations and the strengthening of supervisory capacity. This increase contributes to a balanced distribution of doctoral students and to the diversification of research topics.

The doctoral community within the domain has remained at a significant level throughout the analyzed period. In 2025, there are 81 active doctoral students, and doctoral activity has continued at a steady pace.

Regarding the research infrastructure, the 2021–2025 period was marked by significant modernization of the laboratories used in the domain's activities. New investments were made in equipping research facilities, including the inauguration of the EMERSON Laboratory in 2022, specialized in industrial process automation solutions, and the opening of BoschLab – The Space for Software Defined Vehicles in 2025, established through collaboration with the industrial sector.

These additional investments, which were not part of the domain's structure in 2021, expanded the experimental capacity through new equipment such as industrial robots, IoT systems, and platforms dedicated to advanced control. Furthermore, the Observator Campus modernization project, scheduled for completion in 2026, represents a major improvement in the support infrastructure for students and research, which was not available at the time of the previous evaluation.

II. Methods used

The external evaluation process was conducted based on a comprehensive analysis of the internal evaluation report prepared by IOSUD-UTCN for the doctoral study domain of Systems Engineering (SE), together with the annexes and supporting documentation provided by the institution. In parallel, the evaluation panel reviewed the publicly available institutional information published on the UT Cluj-Napoca and IOSUD-UTCN websites, including regulations, methodologies, operational procedures, CSUD documentation, doctoral-school regulations and information, admission procedures, quality assurance and ethics frameworks, information regarding doctoral supervisors, doctoral theses, research infrastructure, as well as other publicly accessible materials relevant to the assessed doctoral domain.

Furthermore, the panel considered the additional clarifications discussed on site with UTCN.

The evaluation process also comprised the external site visit carried out at the Technical University of Cluj-Napoca during 4-5 June 2026. Throughout the visit, the evaluation panel conducted working sessions and technical discussions within the expert team and held meetings with representatives of the institutional leadership, members of the team responsible for drafting the internal evaluation report,

representatives of quality assurance structures, doctoral supervisors and academic staff involved in the doctoral domain, doctoral students, alumni, employers, research center and laboratory coordinators, as well as representatives of the University Ethics Committee. In addition, the panel inspected the material resources and research infrastructure supporting doctoral activities within the Systems Engineering domain.

The site visit agenda included technical meetings within the ARACIS evaluation panel, discussions with the management of the organisational component, meetings with the internal evaluation team and quality assurance representatives, consultations with doctoral supervisors, teaching staff, doctoral students, alumni and employers, visits to research laboratories and material infrastructure relevant to doctoral studies, discussions with research center coordinators and members of the Ethics Committee, concluding working sessions of the panel, and a final meeting with the representatives of the institution and the evaluated doctoral domain in order to communicate the preliminary findings of the evaluation.

The final assessment was based on the information obtained from the internal evaluation report, annexes, publicly available institutional documentation, supplementary clarifications, and direct observations collected during the evaluation visit. Particular attention was devoted to verifying the consistency between documentary evidence and the actual functioning of the doctoral domain, including the organization of doctoral studies, the adequacy of human and material resources, the quality of research infrastructure, doctoral-student experience, internal quality assurance mechanisms, ethics and academic integrity practices, stakeholder engagement, internationalization activities, and the implementation of recommendations formulated during previous ARACIS evaluations.

III. Judgement on the extent to which the standards and performance indicators are fulfilled

DOMAIN A. Institutional capacity

Criterion A.1. Managerial and administrative structures and processes involving students and other stakeholders

Standard S.A.1.1. Organisational components and institutional processes

The HEI has organisational components in its structure, which function based on adequate competences, responsibilities, processes, and implementation procedures, and ensure an effective management system.

Indicator I.P.A.1.1.1	For delivering the study programme/domain, the HEI has adequate organisational components and an adequate management system, which operate based on methodologies, regulations and procedures that are periodically reviewed as required by law.
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The SE doctoral domain within IOSUD-UTCN operates under a clearly defined institutional and regulatory framework, ensured through the Doctoral School of Automation and Computer Science and supported by established governance structures, regulations, and operational procedures. The internal evaluation report and the public IOSUD documentation confirm the existence of an adequate organizational framework, including doctoral regulations, quality-assurance mechanisms, and operational procedures, which support the effective organization and periodic monitoring of doctoral studies. Overall, the doctoral domain benefits from a coherent management system that ensures the proper functioning and continuous improvement of doctoral activities.

The indicator is: fulfilled

Standard S.A.1.2. Stakeholder engagement

The HEI proves that it engages the relevant stakeholders in developing methodologies and regulations, as well as implementation procedures.

Indicator I.P.A.1.2.1	The opinions of the faculty and department members, of the subsidiary or extension* and of other stakeholders are considered in the process of adopting and revising methodologies, regulations and implementation procedures.
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The doctoral study domain of Systems Engineering operates within a participatory governance framework embedded in IOSUD-UTCN and the UTCN Doctoral School, which ensures the involvement of doctoral supervisors, doctoral students, and academic management structures in the organization, implementation, and periodic revision of doctoral regulations and procedures. Stakeholder participation is supported through the activity of CSUD, the Doctoral School Council, and the Coordination Council for the Doctoral Programs in Automation and Computer Engineering, within which the Systems Engineering domain is integrated. The institutional framework also enables the consultation of relevant external stakeholders, including employers and socio-economic partners, in relation to the continuous development and quality assurance of doctoral studies. At the same time, the public availability of regulations, governance structures, and doctoral-studies documentation on the IOSUD-UTCN website ensures an appropriate level of transparency and stakeholder involvement in the functioning of the doctoral domain.

The indicator is: fulfilled

Criterion A.2. The material resources and optimisation of the use of the material resources

Standard S.A.2.1. Material resources

The HEI owns adequate movable and immovable assets to enable it to carry out the study programme/domain.

Indicator I.P.A.2.1.1	The HEI legally owns venues for the related education, research and administrative processes, as well as for services for students, doctoral students and trainees, thus providing an enabling environment for living and studying, including for disabled persons. Optimal venues are also provided for activities of the staff. Such venues are adequately equipped.
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The doctoral study domain of Systems Engineering benefits from an adequate material base that supports teaching, research, and administrative activities related to doctoral studies. According to the internal evaluation report, doctoral activities are carried out within the infrastructure of the Faculty of Automation and Computer Science and associated research laboratories and centers, which provide access to specialized equipment, software platforms, digital resources, and research facilities relevant to the domain - the EERIS research-infrastructure records linked in the REI describe active research facilities at UTCN.

The research infrastructure has been further strengthened during the 2021–2025 period through investments in advanced laboratories, including the EMERSON Laboratory for industrial process automation and BoschLab – *The Space for Software-Defined Vehicles*, contributing to the expansion of experimental and applied research capabilities. In addition, doctoral students benefit from access to the UTCN Library system, international scientific databases through ANELIS Plus, institutional software resources, and modern campus facilities. Overall, the doctoral domain has access to the material resources, infrastructure, and institutional support necessary for the effective organization and development of doctoral studies.

* The faculty, department, subsidiary, extension - hereinafter “organisational components”

The indicator is: fulfilled

Standard S.A.2.2. Management of material resources

The organisational components manage the movable and immovable assets used for the evaluated study programme/domain in an optimal, sustainable manner.

Indicator I.P.A.2.2.1	The movable and immovable assets are properly maintained to ensure optimal conditions for studying, living and research, as well as for work.
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The material resources used by the doctoral study domain of Systems Engineering are managed within the institutional framework of IOSUD-UTCN, the UTCN Doctoral School, and the Faculty of Automation and Computer Science in a manner that ensures the continuity and effective functioning of doctoral education and research activities. According to the internal evaluation report, the university provides regular maintenance, modernization, and upgrading of teaching and research infrastructure through institutional investment plans and strategic development measures. The research and educational facilities supporting the doctoral domain are maintained in adequate operational and safety conditions and are continuously adapted to current technological and research requirements. Ongoing infrastructure development initiatives, including the modernization of the Observator Campus and the creation of the Institute for Artificial Intelligence, further contribute to improving the conditions for doctoral study, research, and academic work.

The indicator is: fulfilled

Criterion A.3. Adequate human resources and transparent staff recruiting procedures developed according to the law

Standard S.A.3.1. Human resources

The HEI has the required human resources to organise and deliver the evaluated study programme/domain.

Indicator I.P.A.3.1.1	The human resources of the organisational component are suitable to perform the activities pertaining to the evaluated study programme/domain. The teaching staff has the required qualifications and professional competences to teach the subject matters assigned to them in the job list.
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The doctoral study domain of Systems Engineering is supported by doctoral supervisors affiliated with IOSUD-UTCN in accordance with the institutional regulations governing doctoral studies and the national framework for habilitation and doctoral supervision. According to the internal evaluation report, the doctoral supervisors affiliated with the domain fulfil the mandatory national standards and contribute to the coordination of doctoral research within the institutional framework of the UTCN Doctoral School and the Coordination Council for Doctoral Programs in Automation and Computer Science. The domain benefits from an adequate number of doctoral supervisors (19), ensuring balanced supervision and continuity of doctoral activities.

The internal evaluation report further indicates the involvement of academic staff in the advanced training component of doctoral studies and highlights the role of the academic guidance and integrity committees in supporting and monitoring the doctoral students' individual research programs. Overall, the human resources available to the Systems Engineering doctoral domain are adequate for the organization and effective functioning of doctoral studies.

The indicator is: fulfilled

Indicator
I.P.A.3.1.2

The HEI ensures professional and personal development for its staff.

The professional and personal development of the staff involved in doctoral studies within the Systems Engineering doctoral domain is supported through the institutional framework of UTCN, which promotes continuous professional development, research excellence, and internationalization. According to the internal evaluation report, academic staff benefit from opportunities for scientific research, participation in national and international projects, training activities, academic networking, and mobility schemes, including Erasmus+ programs and institutional partnerships.

At the same time, doctoral studies within IOSUD-UTCN operate in a structured institutional environment supported by periodically updated regulations, operational procedures, and publicly available institutional documents. The continuous revision of doctoral regulations and methodologies, together with the integration of quality assurance mechanisms and research support structures, contributes to the professional development and sustained academic engagement of the staff involved in the doctoral domain.

The indicator is: fulfilled

Standard S.A.3.2. Recruitment procedures

Teaching staff recruitment procedures compliant with the provisions of the law.

Indicator
I.P.A.3.2.1

Recruitment procedures comply with the provisions of the law, and are established and carried out transparently.

The recruitment, habilitation, and affiliation of new doctoral supervisors within the Systems Engineering doctoral domain are governed by a clear national and institutional regulatory framework established at the level of IOSUD-UTCN. According to the internal evaluation report, the process is conducted in compliance with the provisions of the Higher Education Law no. 199/2023, the national framework regulating doctoral studies, and the institutional regulations governing the organization of doctoral studies and postdoctoral advanced research programs within UTCN. In addition, the procedures for obtaining the habilitation certificate and affiliation to the UTCN Doctoral School are regulated through dedicated institutional methodologies approved by the University Senate.

The regulatory framework relevant to the recruitment and co-option of doctoral supervisors is publicly available through the IOSUD-UTCN website and includes doctoral regulations, habilitation procedures, institutional methodologies, and operational decisions related to doctoral studies. This framework ensures that recruitment and affiliation procedures applicable to the Systems Engineering doctoral domain are legally grounded, transparent, and aligned with institutional quality assurance requirements.

The indicator is: fulfilled

Criterion A.4. Digitalisation of institutional processes

Standard S.A.4.1. Digital transformation

The digital transformation process in the organisational component seeks to achieve administrative simplification and improve the quality of the services provided to the members of its own community, as well as to third parties.

Indicator
I.P.A.4.1.1

The organisational component uses IT tools in its own procedures, to improve access and provide good quality services for the members of its own community and the indirect beneficiaries of education.

The Systems Engineering doctoral domain at UTCN benefits from the systematic use of information technology tools in the administrative, academic, and quality assurance processes coordinated by IOSUD-

UTCN and the corresponding Doctoral School. According to the REI, doctoral studies are supported through digital platforms that facilitate access to academic and administrative services, online management of doctoral documentation (sis.utcluj.ro), institutional communication, electronic feedback collection, and the use of anti-plagiarism software in doctoral thesis evaluation and validation procedures.

The IOSUD-UTCN doctoral studies website and the institutional regulations and procedures made publicly available illustrate the existence of a structured digital environment supporting doctoral activities in the Systems Engineering domain. Doctoral students and supervisors have online access to doctoral regulations, methodological guidelines, institutional forms, doctoral contracts, research and mobility information, as well as documents relevant to the organization, monitoring, and completion of doctoral studies.

In addition, the use of national digital platforms for doctoral thesis submission, similarity verification, public consultation, and thesis validation contributes to ensuring transparency, academic integrity, and procedural consistency in doctoral finalization. The integration of IT tools within the doctoral process supports accessibility, efficiency of academic and administrative services, effective communication, and the continuous improvement of the quality of doctoral education in the Systems Engineering domain at UTCN.

The indicator is: fulfilled

DOMAIN B. Educational efficacy

Criterion B.1. Content and relevance of study programmes

Standard S.B.1.1. Content of study programme/s*

The study programme is based on a curriculum designed so that students can acquire the expected learning outcomes.

Indicator I.P.B.1.1.1	The study programme is developed and structured according to the expected learning outcomes, and organised based on transferable study credits. It includes all learning, teaching, practical training, research and evaluation experiences, which, together, lead to a higher education qualification.
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The Systems Engineering doctoral program at UTCN is structured in accordance with the expected learning outcomes, the European Credit Transfer and Accumulation System (ECTS), and the institutional framework governing doctoral studies. The program combines an Advanced University Training Program (PPUA), corresponding to 30 ECTS, with a Scientific Research Pathway (PCS), ensuring a balanced integration of academic preparation and independent scientific research.

The advanced training component includes transversal disciplines common to doctoral studies, such as ethics and academic integrity, statistical data processing, and research activity, together with specialized courses selected according to the doctoral thesis topic and research directions. Learning outcomes are clearly defined through course descriptions and competence-based evaluation criteria, supporting the acquisition of advanced scientific and professional skills.

The research component provides a coherent and personalized doctoral trajectory through periodic progress reports, scientific dissemination, participation in research projects, and mobility activities, under the supervision of the doctoral advisor and the guidance committee. The curriculum is therefore designed to integrate learning, research, supervision, and assessment within a coherent academic framework that

* The term “programs” concerns the external quality evaluation for the study programs contained in a master/doctoral domain. The term “program” shall be used hereinafter.

supports doctoral competence development, scientific autonomy, and innovation in the Systems Engineering field.

The indicator is: fulfilled

Criterion B.2. Alignment of the curriculum with the qualification

Standard S.B.2.1. Alignment with the qualification level and the intended competences

In the curriculum design and development process, the organisational component seeks to ensure the qualification level, as well as correlation with the envisaged occupations.

Indicator
I.P.B.2.1.2

The expected learning outcomes are correlated with the competences required by those occupations, according to the occupational standards and/or the European Skills, Competences and Occupations (ESCO).

The expected learning outcomes (ELOs) of the Systems Engineering doctoral program at UTCN are aligned with the competences required by relevant high-level occupations, in accordance with the European Skills, Competences, Qualifications and Occupations (ESCO) classification and national doctoral standards. The doctoral program emphasizes original scientific research and the development of advanced professional and transversal competences required for independent research and innovation in Systems Engineering.

The targeted professional competences include the design, modelling, and integration of complex systems, the development of advanced control and automation solutions, and expertise in areas such as control systems, robotics, cyber-physical systems, and industrial automation. Transversal competences include critical and systemic thinking, interdisciplinary research management, scientific communication, and academic ethics and integrity.

The relevance of the doctoral training is supported by doctoral student involvement in research projects, scientific publications, and dissemination activities, ensuring the development of competences required for advanced research, industrial R&D, systems integration, and automated systems architecture.

The indicator is: fulfilled

Criterion B.3. Student-centred learning, teaching and evaluation

Standard S.B.3.1 Principles

The organisational component implements the principles of student-centred learning.

Indicator
I.P.B.3.1.1

The organisational component ensures implementation of the student-centred learning in the curriculum and through the teaching strategies used in the learning and teaching activities and experiences.

The organizational component of the Systems Engineering doctoral program at UTCN ensures the implementation of student-centered learning principles through a flexible and personalized curriculum. Doctoral students can tailor their learning pathway by selecting optional courses within the Advanced University Training Program (PPUA), according to the doctoral thesis topic and research interests. The program combines advanced academic training with complementary research activities and provides continuous mentoring through the doctoral supervisor and the guidance committee. Doctoral progress is monitored through scientific outputs, seminar participation, conferences, and regular feedback.

Student-centered learning is further supported by access to research infrastructure, laboratories, licensed software, and digital resources. Feedback collected from doctoral students confirms the relevance of the courses, the quality of supervision, and the effectiveness of academic support. Beginning with the

academic year 2025–2026, the inclusion of at least one external IOSUD member in each guidance committee further strengthens mentoring quality and research diversity.

The indicator is: fulfilled

Indicator I.P. B.3.1.2	The organisational component ensures opportunities for students to participate in academic mobility programmes organised in person and/or virtually.
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The organizational component of the Systems Engineering doctoral program at UTCN ensures doctoral students' real opportunities to participate in academic mobility programs, both physical and virtual, supporting internationalization and advanced research training. Doctoral students are encouraged to engage in research stays, Erasmus+, EUT+, and Horizon Europe activities, international conferences, and collaborative research projects with partner institutions.

Academic mobility is further supported through participation in international scientific events, co-supervised research activities, and involvement in international research projects, facilitating access to advanced research infrastructures and global academic networks. The consistent participation of doctoral students in conferences, mobility activities, and international projects demonstrates the effective implementation of institutional mechanisms supporting international exposure and scientific collaboration.

The indicator is: fulfilled

Standard S.B.3.2. Fairness	
The organisational component provides fair opportunities for students.	
Indicator I.P.B.3.2.1	The organisational component provides fair opportunities for students, in line with their potential and aspirations, taking into account the diversity of learning styles and abilities

The organizational component of the Systems Engineering doctoral program at UTCN ensures equitable opportunities for doctoral students, considering their academic potential, research interests, and diversity of learning styles. Equal access to academic, research, and professional development resources is supported through institutional regulations, doctoral supervision, and transparent support mechanisms.

Doctoral students benefit from continuous academic guidance, access to research laboratories, licensed software, scientific databases, and institutional digital resources. Financial support is also provided for research dissemination, conference participation, academic mobility, and training activities, with transparent allocation procedures coordinated at doctoral school level.

The doctoral program further promotes inclusiveness through accessibility measures for students with disabilities and systematic feedback mechanisms regarding teaching quality and supervision. Overall, the organizational framework ensures fair access to opportunities and supports doctoral students according to their individual needs and aspirations.

The indicator is: fulfilled

Criterion B.4. Accessibility and efficiency of the resources and support services, adequate for learning

Standard S.B.4.1. Access to resources and services	
The organisational component provides access to adequate resources and support services, according to the needs of the students.	

Indicator I.P.B.4.1.1	The organisational component provides students, including those with special educational needs/disabilities, with access to resources and services designed to support the learning process, adequate for the individual learning needs, the study domain, the study cycle, and the form of organisation of the study programme.
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The organizational component of the Systems Engineering doctoral program at UTCN ensures student access to learning resources and support services tailored to individual educational needs, study level, and research requirements, including for students with special educational needs or disabilities. Doctoral students benefit from access to modern teaching and research infrastructure, specialized laboratories, library resources, digital platforms, international scientific databases, and licensed software supporting advanced research activities.

Educational and professional support is further ensured through counseling, career guidance, tutoring, and international mobility services provided by institutional structures such as the Career Counseling and Guidance Center (CCOC), the International Relations Office (ORI), and Erasmus+ programs. Doctoral students also have access to advanced research infrastructure, including HPC facilities (CloudUT, GPU servers) and scientific software relevant to the Systems Engineering field.

UTCN implements concrete accessibility measures for students with disabilities or special educational needs through adapted infrastructure, assistive technologies, flexible learning and assessment arrangements, and institutional support initiatives. The effectiveness of these services is continuously monitored through questionnaires and annual reports, supporting the continuous improvement of educational resources, digital services, and doctoral learning conditions.

The indicator is: fulfilled

Criterion B.5. Learning outcomes

Standard S.B.5.1. Definition and evaluation

Learning outcomes are adequately defined and evaluated.

Indicator I.P.B.5.1.1	Learning outcomes are adequately described, and they support understanding of the students' and teachers' expectations regarding the content of the subject matters in the curriculum.
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According to the Institutional Regulation, the PPUA is a compulsory component of the doctoral programme aimed at developing advanced competences required for doctoral research. Doctoral students complete 3–4 subjects during the first year, selected according to the doctoral research topic and approved by the competent academic structures.

The curriculum (PPUA/PCS) for the doctoral field of Systems Engineering is designed to develop advanced research competences and promote academic integrity, with learning outcomes formulated in terms of knowledge, skills, responsibility and autonomy, in accordance with the ARACIS requirements for Cycle III studies.

According to the Institutional Regulation, each doctoral student completes at least three subjects within the Advanced University Studies Programme (PPUA) during the first year of doctoral studies. These subjects are selected according to the doctoral research topic and approved by the Doctoral School. In the current implementation, the doctoral training pathway includes two compulsory cross-cutting subjects for all doctoral students: Academic Ethics and Integrity and Research Methodology and Applied Statistics.

The remaining PPUA subjects are taken from research-oriented Master's degree programmes, in accordance with the Institutional Regulation, and are selected based on their relevance to the doctoral research topic. This institutional framework applies uniformly to all doctoral fields within the IOSUD, where the PPUA is organized using research-oriented Master's courses selected according to the specific research needs of each doctoral field.

The course syllabi used within the PPUA are the same as those of the corresponding Master's programmes and are published on the electronic platforms/websites of the Faculty of Automation and Computers, the IOSUD, and the Doctoral School. They follow a standard structure including course objectives, learning outcomes, course contents, teaching and learning methods, assessment methods, and bibliography.

Recommendation: The IOSUD is encouraged to develop and publish doctoral-level syllabi for all PPUA disciplines, reflecting the specific objectives, learning outcomes, assessment methods and minimum performance standards required for doctoral education, thus ensuring a clear distinction from the research-oriented Master's courses currently used.

The indicator is: fulfilled

Indicator I.P.B.5.1.2	Achievement of the learning outcomes is checked in ongoing examinations and study completion exams.
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According to the Institutional Regulation, the Advanced University Studies Programme (PPUA) is implemented uniformly across all doctoral fields within the IOSUD. The programme consists of research-oriented Master's courses selected according to the doctoral research topic, while participation is documented through certificates issued by the course instructor and countersigned by the doctoral supervisor. The corresponding course syllabi are those of the Master's programmes from which the PPUA subjects are selected and are published on the electronic platforms of the Faculty, the Doctoral School and the IOSUD. The evaluation of doctoral students is further supported by the assessment of research reports and the public defence of the doctoral thesis, ensuring verification of the expected learning outcomes throughout the doctoral programme.

Participation in each discipline is formally documented through participation certificates issued by the course instructor and countersigned by the doctoral supervisor, providing evidence that the curricular obligations of the PPUA have been fulfilled, so the completion of the PPUA disciplines is formally documented by attendance certificates issued to doctoral students. However, the results of these disciplines are currently not recorded as grades or qualifications in an official academic record (catalogue).

Recommendation: To further strengthen the quality assurance of the doctoral programme, it is recommended that doctoral-specific syllabi be gradually introduced for all PPUA disciplines. In addition, the IOSUD is encouraged to establish a formal mechanism for recording the assessment outcomes of PPUA disciplines, alongside the existing attendance certificates, thereby improving the documentation and traceability of students' academic achievements.

The indicator is: fulfilled

Criterion B.7. Procedures and practices regarding the admission competition, the journey, recognition and equivalence of studies, and result certification

Standard S.B.7.1. Admission	
The admission procedures and principles ensure access to higher education.	
Indicator I.P.B.7.1.1	The organisational component applies the admission procedures.

Admission to the Systems Engineering doctoral program at UTCN is organized according to transparent, equitable, and publicly available procedures, in compliance with the Higher Education Law no. 199/2023, Ministerial Order no. 3020/2024, and the institutional doctoral admission regulations approved by CSUD.

Doctoral research topics proposed by supervisors are publicly announced, allowing candidates to select research directions according to their academic interests and supervisor availability. The admission process, including requirements, examination topics, calendar, and results, is published on the IOSUD website, ensuring transparency and equal access.

Since 2025, the admission process has been fully digitalized through the Integrated Student System (sis.utcluj.ro), enabling online registration, document submission, supervisor selection, and fee payment, while maintaining transparent communication and publication of results through official IOSUD channels. Overall, the organizational component effectively applies clear and accessible admission procedures for doctoral candidates.

The indicator is: fulfilled

Indicator I.P.B.7.1.2	Admission in higher education study programmes complies with the principles of fairness and equal opportunities, and with the establishing of support measures to ensure access of vulnerable groups at social and educational risk, including candidates with special educational needs and/or disabilities.
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Admission to the Systems Engineering doctoral program at UTCN is organized in accordance with the principles of equity, equal opportunities, and transparency, ensuring fair access to doctoral studies for all candidates, including vulnerable groups and students with special educational needs or disabilities.

The admission procedure is publicly regulated, with examination topics, requirements, and results transparently published through IOSUD channels. UTCN provides concrete support measures for candidates with disabilities or special educational needs, including adapted infrastructure, counseling services, and flexible arrangements for examinations and academic activities, ensuring equal access to doctoral education.

Following the discussions with doctoral students, it resulted that the admission process is generally known by the candidates, especially regarding the presentation of the research topic and the evaluation by the admission committee. However, some doctoral students were not fully aware of the detailed criteria used for ranking candidates and for allocating places among the available categories, namely budget-funded places with scholarship, budget-funded places without scholarship, and tuition-fee places.

Recommendation: It is recommended to clearly communicate the candidate ranking criteria and the allocation rules for budget-funded, scholarship-funded and tuition-fee places before the admission process.

The indicator is: fulfilled

Standard S.B.7.2. Academic journey of students	
The organisational component carries out actions supporting the students' academic journey.	
Indicator I.P.B.7.2.1	The organisational component applies the regulations concerning the students' professional activity.

The organizational component of the Systems Engineering doctoral program at UTCN effectively applies regulations concerning doctoral students' professional activity through clear institutional procedures, continuous academic monitoring, and research support mechanisms. The coordination council actively oversees doctoral supervision, thesis committees, admission procedures, research progress, and academic integrity through anti-plagiarism verification.

Doctoral students benefit from access to research infrastructure, digital resources, institutional support for scientific events and mobility, and active involvement in research projects. Continuous monitoring of academic progress and institutional support ensure compliance with doctoral regulations and contribute to high-quality doctoral training.

The indicator is: fulfilled

Criterion B.8. Internationalisation process

Standard S.B.8.1. Internationalisation

Improving the quality of education and research through internationalisation actions.

Indicator I.P.B.8.1.1	The organisational component carries out international cooperation actions supporting mobility of the members of its own community and collaboration in academic and research activities.
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The organizational component of the Systems Engineering doctoral program at UTCN actively supports internationalization through academic cooperation, mobility, and research collaboration. Doctoral students benefit from international research stays, conference participation, and involvement in international research projects, strengthening their integration into global academic networks.

Internationalization is reflected through doctoral mobility, participation in international scientific events, the involvement of international researchers in doctoral thesis defenses and seminars, and participation in international research projects. These activities contribute to increasing research visibility, improving scientific quality, and strengthening international academic collaboration within the doctoral field.

Recommendation: Promote the internationalization of the doctoral domain through targeted mobility schemes, joint supervision initiatives, international research partnerships, and enhanced accessibility of English-language institutional information.

The indicator is: fulfilled

Criterion B.9. Scientific research results

Standard S.B.9.1 Scientific research in the education process

Scientific research activities support students in achieving the learning outcomes.

Indicator I.P.B.9.1.1	Learning based on scientific investigation and research results support and are capitalised upon in achieving the learning outcomes envisaged through the study programme.
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Scientific research activities within the Systems Engineering doctoral program at UTCN directly support the achievement of learning outcomes through research-based, student-centered doctoral education. Learning is integrated with scientific investigation through the Advanced University Training Program (PPUA), individual research plans, and access to advanced laboratories, licensed software, and research infrastructures.

Doctoral students develop competences in theoretical analysis, modelling, experimentation, and scientific validation through participation in research projects, workshops, international collaborations, and dissemination activities. Research results are reflected in scientific publications, conference participation, prototypes, and technology transfer activities, supporting the acquisition of advanced research skills and international scientific visibility.

Recommendation: Maintain support for doctoral students in identifying appropriate, internationally recognized publication venues and promoting publication in high-impact indexed journals.

The indicator is: fulfilled

Standard S.B.9.2. Scientific research pertaining to the objectives of the study programme

The organisational component carries out scientific research activities aligned with the objectives of the evaluated study programme.

Indicator I.P.B.9.2.1	The results of scientific research are visible at national and international level in that scientific domain, and capitalised upon in an adequate manner.
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The Systems Engineering doctoral program at UTCN conducts scientific research activities in line with the objectives of the doctoral program, promoting excellence in research, innovation, and advanced scientific training. Research outcomes are visible and effectively capitalized at national and international level through scientific publications, conference participation, research projects, patents, and technology transfer activities.

The strong scientific visibility of the doctoral field is reflected in a significant number of WoS-indexed publications, citations, research projects, patents, and scientific awards achieved by both doctoral supervisors and doctoral students. Doctoral students actively contribute to research through publications, conference participation, international mobility, and involvement in research projects, demonstrating the effective integration of research within doctoral education and the achievement of program objectives.

The indicator is: fulfilled

DOMAIN C. Quality management

Criterion C.1. Quality assurance strategies and procedures, including in the field of academic ethics and conduct, which involve students, employers and other stakeholders and are applied in a consistent, transparent manner

Standard S.C.1.1. Application

Adequately implemented strategic directions, actions, and procedures

Indicator I.P.C.1.1.1	The organisational component consistently carries out actions and applies procedures, proving their impact on improving the quality of education at the level of the study programme
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The Systems Engineering doctoral program at UTCN consistently implements quality assurance procedures aimed at improving the quality of doctoral education and research activities. Quality assurance is aligned with national legislation, ARACIS standards, and ESG principles, and is coordinated through institutional structures such as CSUD, quality committees, and doctoral program coordination bodies.

Internal evaluation is carried out using standardized and officially approved instruments, including self-assessment reports for doctoral supervisors and doctoral students, procedures for doctoral thesis completion, and periodic monitoring of doctoral progress. Academic integrity is systematically ensured through institutional anti-plagiarism procedures using Turnitin, with multi-stage similarity verification integrated into the doctoral thesis evaluation process.

Continuous quality improvement is further supported through regular feedback collected from doctoral students, which is used to adjust PPUA courses, improve supervision practices, and clarify doctoral procedures. Student feedback indicates a high level of satisfaction regarding course relevance, doctoral supervision, ethical guidance, and academic support, demonstrating the positive impact of quality assurance mechanisms on the continuous development of the doctoral program.

The indicator is: fulfilled

Standard S.C.1.2. Stakeholder engagement

The HEI proves that it engages the stakeholders who have relevant activity in applying the procedures.

Indicator I.P.C.1.2.1	The opinions of the members of its own community and of other stakeholders are taken into account in the procedure implementation process.
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The Systems Engineering doctoral program at UTCN systematically involves doctoral students, academic staff, employers, and other relevant stakeholders in the implementation and continuous improvement of quality assurance procedures. Stakeholder feedback is collected through institutional regulations, annual satisfaction surveys, self-assessment reports, thematic meetings, and digital platforms, ensuring transparency and continuous quality enhancement.

Doctoral students actively contribute through annual satisfaction questionnaires and self-evaluation reports, providing feedback on doctoral supervision, PPUA courses, infrastructure, and research support. Academic staff and doctoral supervisors participate through periodic evaluations, institutional reports, and quality assurance committees, while employers and external partners contribute through consultations, research collaborations, and participation in doctoral evaluation processes.

Academic integrity and ethical standards are supported through institutional procedures, plagiarism prevention mechanisms, and systematic originality verification. Feedback results indicate a high level of satisfaction regarding doctoral integration, supervision quality, course relevance, and ethics-related information, demonstrating the effective involvement of stakeholders in improving the doctoral program and supporting evidence-based decision-making.

The indicator is: fulfilled

Criterion C.2. Functionality of education quality assurance structures, including in the field of academic ethics and conduct, according to the law

Standard S.C.2.2. Operation

Quality assurance and academic ethics and conduct organisational structures adequately perform their specific role and functions.

Indicator I.P.C.2.2.2.	The academic ethics commission operates based on the regulation approved by the University Senate, and performs actions that are compliant with the law, independently from any other structure or person in the higher education institution.
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The Systems Engineering doctoral program at UTCN benefits from a well-structured and functional quality assurance and academic ethics framework, aligned with national legislation, ARACIS standards, and ESG principles. Quality assurance processes are coordinated through institutional structures such as CSUD, CEAC, DAC, faculty quality committees, and the University Ethics Committee, ensuring the continuous monitoring of doctoral education quality, research performance, and compliance with institutional regulations.

The University Ethics Committee operates independently under regulations approved by the UTCN Senate and acts autonomously from any institutional structure or individual, in accordance with legal provisions. Its responsibilities include preventing and addressing ethical misconduct, analyzing cases related to plagiarism, conflicts of interest, and academic integrity violations, as well as issuing recommendations and monitoring ethical standards through periodic reports. Dedicated specifically to doctoral university studies, a research ethics subcommittee operates with the responsibility of implementing policies pertaining to scientific integrity. Its sphere of competence obligatorily encompasses the following aspects: publication norms and authorship, upholding the dignity of research participants, the application of ethical standards in research involving human subjects and in animal experiments, adherence to general bioethical principles, research data management, the governance of collaborations and conflicts of interest,

fraud prevention, the provision of an effective research environment, as well as the prevention of prejudice in research and innovation endeavors

Within IOSUD-UTCN, doctoral research activities are supported by clear operational procedures regarding thesis completion, originality verification, and ethical conduct. Academic integrity is systematically ensured through the use of Turnitin for plagiarism prevention, originality declarations signed by doctoral students and supervisors, and transparent procedures for thesis evaluation and validation. These mechanisms strengthen trust, transparency, and accountability in doctoral education.

Overall, the consistent functioning of quality assurance and ethics structures contributes to maintaining high academic standards, ensuring compliance with ethical principles, and continuously improving the quality and integrity of doctoral research in the Systems Engineering domain.

Recommendation: Promote the responsible integration of artificial intelligence in doctoral studies through the development of institutional guidance covering research, academic writing, evaluation, and thesis preparation.

The indicator is: fulfilled

Criterion C.3. Procedures for the initiation, monitoring and periodic review of the study programmes and domains and of the performed activities, involving students, employers and other stakeholders

Standard S.C.3.1. Procedures and implementation of procedures	
The HEI has procedures for initiating, monitoring, and periodically reviewing the study programmes and domains and the performed activities, and applies them systematically.	
Indicator I.P.C.3.1.1	The organisational component consistently applies the procedures, and proves their impact on quality assurance.

The Systems Engineering doctoral program at UTCN consistently applies procedures for the initiation, monitoring, and periodic review of doctoral studies, demonstrating their impact on quality assurance and continuous improvement. These procedures are implemented according to IOSUD self-evaluation methodologies and are aligned with ARACIS and ESG standards, ensuring a structured annual evaluation cycle involving data collection, analysis, review, and implementation of improvement measures.

Quality monitoring is supported through self-assessment reports for doctoral students and supervisors, annual IOSUD reports, and coordination council and CSUD meetings, ensuring transparency and traceability of decisions. The impact of these procedures is reflected in the strengthening of doctoral supervision capacity (from 16 supervisors in 2021 to 19 in 2025), a stable doctoral community of 81 active doctoral students, and the successful completion of 25 doctoral theses during 2021–2025.

The systematic application of quality procedures has supported curriculum updates, adjustments of doctoral requirements, and continuous adaptation of research topics to scientific and societal needs, confirming the effective functioning of the doctoral quality assurance framework.

The indicator is: fulfilled

Indicator I.P.C.3.1.2	Members of its own community and other stakeholders are involved in the procedure implementation process.
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The Systems Engineering doctoral program at UTCN actively involves doctoral students, academic staff, and external stakeholders in the implementation of quality assurance procedures through transparent and traceable institutional mechanisms. Decision-making processes are supported by CSUD, CEAC/DAC, doctoral school councils, and university governance structures, ensuring consultation, approval, publication, and monitoring of academic procedures.

Stakeholder involvement is achieved through annual feedback questionnaires, self-assessment reports, periodic meetings, and consultations with industry and external experts. Doctoral students and supervisors contribute to the adaptation of the PPUA, evaluation criteria, research topics, and methodological needs, while industry feedback has supported updates of doctoral and master curricula in areas such as AI, cyber-physical systems, robotics, IoT, and automation.

The active participation of 19 doctoral supervisors, 81 doctoral students, and external experts in research collaborations, workshops, thesis committees, and Horizon Europe initiatives demonstrates the effective implementation of procedures and their impact on improving the relevance, transparency, and quality of doctoral education.

The indicator is: fulfilled

Criterion C.4. Procedures for the periodic evaluation of the quality of the activities of teaching staff, auxiliary teaching staff, and administrative staff

Standard S.C.4.1. Procedures

Applying the methodologies and procedures contributes to improving the quality of the staff's activities.

Indicator I.P.C.4.1.1	The organisational component analyses the results of the students' biannual evaluation of teachers.
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The Systems Engineering doctoral program at UTCN systematically analyses the results of doctoral students' evaluations of teaching staff in order to improve educational quality and doctoral supervision. Evaluation is conducted online, anonymously, and transparently, based on institutional methodology, through questionnaires addressing teaching quality, course clarity, academic support, ethics, and teaching effectiveness.

The results are analyzed at department, faculty, and IOSUD level, with improvement measures discussed in coordination councils and integrated into doctoral development plans. Feedback from doctoral students indicates a high level of satisfaction regarding PPUA courses, teaching quality, and supervisor involvement, confirming the relevance of the curriculum and the effectiveness of academic support mechanisms.

Recommendation: Doctoral student feedback and teaching evaluation processes require stronger consolidation and clearer reporting at domain level.

The indicator is: fulfilled

Criterion C.5. Systematically updated databases on internal quality assurance

Standard S.C.5.1. Databases

The HEI uses databases to support internal quality assurance activities.

Indicator I.P.C.5.1.1	The organisational component systematically collects and analyses data required for the internal quality assurance process.
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The Systems Engineering doctoral program at UTCN systematically collects and analyses data necessary for internal quality assurance through an integrated system of institutional databases and digital platforms. These include SIMAC+ for research activity monitoring, JobRouter for administrative workflows, the IOSUD platform and doctorat.utcluj.ro for doctoral regulations, reports, thesis management, and Turnitin verification, as well as the Web SINU platform for student feedback and academic records.

The collected data support the monitoring of doctoral progress, PPUA courses, research stages, doctoral supervisors, thesis completion, and academic performance. Annual reporting to RMU, ANS, and

INS, together with IOSUD, DAC, and CEAC reports, ensures traceability, transparency, and compliance with national regulations and ESG standards.

The systematic use of these databases provides a solid basis for self-evaluation, internal quality assurance, and evidence-based decision-making, while the transition to the SIS App UTCN platform will further improve the monitoring of doctoral pathways and academic activities.

The indicator is: fulfilled

Criterion C.6. Transparency of information of public interest, including those regarding the study programmes and domains offered, and transparency regarding the related certificates, diplomas and qualifications

Standard S.C.6.1. Transparency	
The organisational component ensures transparency of information, as required by the law.	
Indicator I.P.C.6.1.1	The organisational component ensures publication and access to information of public interest regarding the evaluated study programme.

The Systems Engineering doctoral program at UTCN ensures a high level of transparency regarding public information relevant to doctoral studies, in accordance with national legislation and institutional regulations. Public access to information is provided through the IOSUD UTCN platform and doctoral school webpages, which centralize regulations, procedures, academic documents, and information relevant to doctoral students, supervisors, and external stakeholders.

Key publicly available information includes doctoral admission procedures, doctoral school regulations, thesis completion procedures, public thesis defense schedules and committees, research topics, doctoral supervisors and their expertise, as well as the structure of the Advanced University Training Program (PPUA). The doctoral school webpage also provides updated information regarding enrolled doctoral students, doctoral coordination structures, and contact details, ensuring transparency in academic governance and doctoral activities.

The systematic publication and periodic updating of regulations, calendars, doctoral procedures, and thesis-related information support informed decision-making, equal access to information, and institutional accountability. Overall, UTCN demonstrates a strong commitment to transparency, while further efforts are directed toward standardizing doctoral webpages and improving the consistency and accessibility of online information.

The indicator is: fulfilled

Indicator I.P.C.6.1.2	The organisational component ensures transparent decision-making processes.
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The Systems Engineering doctoral program at UTCN ensures a high level of transparency in decision-making through clear institutional procedures and public access to academic information. Decisions regarding doctoral studies, admission, doctoral supervision, quality standards, mobility, and thesis defenses are adopted through CSUD, doctoral coordination councils, and university governance structures, and are systematically published on UTCN and IOSUD platforms.

Transparency is supported through the publication of Senate decisions, regulations, procedures, doctoral topics, supervisors, thesis defense information, and habilitation procedures, ensuring accessibility and traceability of decisions. For the Systems Engineering domain, dedicated IOSUD and doctoral school webpages provide updated information on doctoral supervisors, research topics, and administrative procedures.

Overall, decision-making transparency is effectively implemented through publicly available, chronologically structured, and regularly updated information, supporting institutional accountability and informed participation of doctoral students and stakeholders.

The indicator is: fulfilled

Criterion C.8. Participation in external evaluation processes, according to the law

Standard S.C.8.1. Compliance with the external evaluation obligation

The HEI undergoes external quality evaluation as required by the law.

Indicator I.P.C.8.1.1	The organisational component carries out the procedures pertaining to the external quality evaluation process, aiming to organise the evaluated study programme as provided by the law.
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The Systems Engineering doctoral program at UTCN consistently complies with external quality evaluation requirements and applies the procedures necessary for maintaining accreditation in accordance with ARACIS standards and national legislation. UTCN actively participates in periodic external evaluations, contributing to quality assurance, transparency, and academic credibility, while maintaining a “high degree of confidence” institutional status.

For the Systems Engineering doctoral domain, external evaluation follows the standard ARACIS cycle, with the latest full evaluation conducted in 2021, followed by intermediate monitoring and implementation of recommendations. The accreditation of the doctoral domain was maintained following the ARACIS evaluation process.

UTCN systematically coordinates all evaluation stages, including preparation of self-evaluation reports, document verification, evidence collection, organization of evaluation visits, and communication with external evaluators. Institutional methodologies ensure clear responsibilities, data traceability, and the integration of recommendations from previous evaluations, demonstrating a mature and coherent external quality assurance process.

The indicator is: fulfilled

IV. SWOT Analysis

Strengths:		Weaknesses:
- Increase in the number of doctoral supervisors (from 16 in 2021 to 19 in 2025), ensuring strengthened supervision capacity. -Stable doctoral community: 81 active doctoral students and 25 publicly defended doctoral theses during 2021–2025. -Modernized infrastructure: specialized laboratories (BoschLab – 2025, Emerson – 2022), access to HPC	INTERNAL FACTORS 	- The distribution of external thesis reviewers was partially non-compliant in 2021 (corrected following the intermediate evaluation). - Lack of standardization of doctoral domain webpages and insufficient periodic updating of public information. - Limited number of jointly supervised (co-tutelle) doctoral theses. - Limited number of

platforms (CloudUT), and licensed software (MATLAB). - Advanced digitalization: integrated workflows through SIS App, JobRouter, and SIMAC+, with access to academic resources via Microsoft 365 and ANELIS Plus. - Strong scientific output over the last five years: 128 WoS-indexed articles published by doctoral students, 170 WoS-indexed articles published by doctoral supervisors, and an average Hirsch index of 11.3 (WoS). - Strategic partnerships with industry (Bosch, Emerson, Tenaris) and active involvement in applied research projects. - The PPUA is organized within a clear institutional framework, uniformly applied across all doctoral fields of the IOSUD, ensuring transparency and consistency in the implementation of doctoral training.		international mobility activities. - Need to diversify PPUA courses to include emerging topics such as AI, industrial cybersecurity, and digital twin technologies. - The PPUA currently uses the course syllabi of research-oriented Master's programmes, in accordance with the Institutional Regulation, without doctoral-specific syllabi for the PPUA disciplines. - The assessment of PPUA disciplines is currently documented through participation certificates, while the assessment outcomes are not formally recorded in the academic catalogue.
SWOT analysis		
Opportunities: - Growing demand for Industry 4.0/5.0 competences, including advanced automation and robotics. - Access to European programmes (Horizon Europe, EUt+) and international research infrastructures through strategic partnerships.	 EXTERNAL FACTORS	Threats: - Increasing competition from other European technical universities in attracting doctoral students and research funding. - Volatility of public funding and the risk of reduced budgets for research and mobility activities. - Accelerated technological changes, requiring rapid

- Development of international co-tutelle doctoral programs and the attraction of foreign researchers for lectures and doctoral committees. - Potential for expanding collaboration with industry to create interdisciplinary hubs and joint research laboratories. - Full digitalization of academic and administrative processes through the SIS App and the integration of AI in education. - Development and gradual implementation of doctoral-specific syllabi for all PPUA disciplines, explicitly defining doctoral learning outcomes, assessment methods and minimum performance standards. - Further strengthening the documentation and traceability of learning outcomes through the formal recording of PPUA assessment results.		adaptation of curricula and research infrastructure. - Lengthy bureaucratic processes related to obtaining the doctoral degree and habilitation qualification.
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V. Extent to which the standards and performance indicators are fulfilled, and recommendations

No.	Performance Indicator	Extent to which it was fulfilled (F/PF/UF)	Recommendations
DOMAIN A. Institutional capacity			
1.	I.P.A.1.1.1 For delivering the study programme/domain, the HEI has adequate organisational components and an adequate management system, which operate based on methodologies, regulations and procedures that are periodically reviewed as required by law.	F	
2.	I.P.A.1.2.1 The opinions of the faculty and department members, of the subsidiary or extension and of other stakeholders are considered in the process of adopting and revising methodologies, regulations and implementation procedures.	F	
3.	I.P.A.2.1.1 The HEI legally owns venues for the related education, research and administrative processes, as well as for services for students, doctoral students and trainees, thus providing an enabling environment for living and studying, including for disabled persons. Optimal venues are also provided for activities of the staff. Such venues are adequately equipped.	F	
4.	I.P.A.2.2.1 The movable and immovable assets are properly maintained to ensure optimal conditions for studying, living and research, as well as for work.	F	
5.	I.P.A.3.1.1 The human resources of the organisational component are suitable to perform the activities pertaining to the evaluated study programme/domain. The teaching staff has the required qualifications and professional competences to teach the subject matters assigned to them in the job list.	F	
6.	I.P.A.3.1.2 The HEI ensures professional and personal development for its staff.	F	
7.	I.P.A.3.2.1 Recruitment procedures comply with the provisions of the law, and are established and carried out transparently.	F	
8.	I.P.A.4.1.1 The organisational component uses IT tools in its own procedures, to improve access and provide good quality services for the members of its own community and the indirect beneficiaries of education.	F	
DOMAIN B. Educational efficacy			
9.	I.P.B.1.1.1 The study programme is developed and structured according to the expected learning outcomes, and organised based on transferable study credits. It includes all learning, teaching, practical training, research and evaluation experiences, which, together, lead to a higher education qualification.	F	
10.	I.P.B.2.1.2 The expected learning outcomes are correlated with the competences required by those occupations, according to the	F	

No.	Performance Indicator	Extent to which it was fulfilled (F/PF/UF)	Recommendations
	occupational standards and/or the European Skills, Competences and Occupations (ESCO).		
11.	I.P.B.3.1.1 The organisational component ensures implementation of the student-centred learning in the curriculum and through the teaching strategies used in the learning and teaching activities and experiences.	F	
12.	I.P.B.3.1.2 The organisational component ensures opportunities for students to participate in academic mobility programmes organised in person and/or virtually.	F	
13.	I.P.B.3.2.1 The organisational component provides fair opportunities for students, in line with their potential and aspirations, taking into account the diversity of learning styles and abilities.	F	
14.	I.P.B.4.1.1 The organisational component provides students, including those with special educational needs/disabilities, with access to resources and services designed to support the learning process, adequate for the individual learning needs, the study domain, the study cycle, and the form of organisation of the study programme.	F	
15.	I.P.B.5.1.1 Learning outcomes are adequately described, and they support understanding of the students' and teachers' expectations regarding the content of the subject matters in the curriculum.	F	The IOSUD is encouraged to develop and publish doctoral-level syllabi for all PPUA disciplines, reflecting the specific objectives, learning outcomes, assessment methods and minimum performance standards required for doctoral education, thus ensuring a clear distinction from the research-oriented Master's courses currently used.
16.	I.P.B.5.1.2 Achievement of the learning outcomes is checked in ongoing examinations and study completion exams.	F	To further strengthen the quality assurance of the doctoral programme, it is recommended that doctoral-specific syllabi be gradually introduced for all PPUA disciplines. In addition, the IOSUD is encouraged to establish a formal mechanism for recording the assessment outcomes of PPUA disciplines, alongside the existing attendance certificates, thereby improving the documentation and traceability of students' academic achievements.
17.	I.P.B.7.1.1 The organisational component applies the admission procedures.	F	
18.	I.P.B.7.1.2 Admission in higher education study programmes complies with the principles of fairness and equal opportunities, and with the establishing of support measures to ensure access of vulnerable groups at social and	F	It is recommended to clearly communicate the candidate ranking criteria and the allocation rules for budget-funded, scholarship-funded and tuition-fee places before the admission process.

No.	Performance Indicator	Extent to which it was fulfilled (F/PF/UF)	Recommendations
	educational risk, including candidates with special educational needs and/or disabilities.		
19.	I.P.B.7.2.1 The organisational component applies the regulations concerning the students' professional activity.	F	
20.	I.P.B.8.1.1 The organizational component carries out international cooperation actions supporting mobility of the members of its own community and collaboration in academic and research activities.	F	Promote the internationalization of the doctoral domain through targeted mobility schemes, joint supervision initiatives, international research partnerships, and enhanced accessibility of English-language institutional information.
21.	I.P.B.9.1.1 Learning based on scientific investigation and research results support and are capitalised upon in achieving the learning outcomes envisaged through the study programme.	F	Maintain support for doctoral students in identifying appropriate, internationally recognized publication venues and promoting publication in high-impact indexed journals.
22.	I.P.B.9.2.1 The results of scientific research are visible at national and international level in that scientific domain, and capitalized upon in an adequate manner.	F	
DOMAIN C. Quality management			
23.	I.P.C.1.1.1 The organisational component consistently applies the procedures, and proves their impact on quality assurance.	F	
24.	I.P.C.1.2.1 The opinions of the members of its own community and of other stakeholders are taken into account in the procedure implementation process.	F	
25.	I.P.C.2.2.2. The academic ethics commission operates based on the regulation approved by the University Senate, and performs actions that are compliant with the law, independently from any other structure or person in the higher education institution.	F	Promote the responsible integration of artificial intelligence in doctoral studies through the development of institutional guidance covering research, academic writing, evaluation, and thesis preparation.
26.	I.P.C.3.1.1 The organisational component consistently applies the procedures, and proves their impact on quality assurance.	F	
27.	I.P.C.3.1.2 Members of its own community and other stakeholders are involved in the procedure implementation process.	F	
28.	I.P.C.4.1.1 The organisational component analyses the results of the students' biannual evaluation of teachers.	F	Doctoral student feedback and teaching evaluation processes require stronger consolidation and clearer reporting at domain level.
29.	I.P.C.5.1.1 The organisational component systematically collects and analyses data required for the internal quality assurance process.	F	
30.	I.P.C.6.1.1 The organisational component ensures publication and access to information of public interest regarding the evaluated study programme.	F	

No.	Performance Indicator	Extent to which it was fulfilled (F/PF/UF)	Recommendations
31.	I.P.C.6.1.2 The organisational component ensures transparent decision-making processes.	F	
32.	I.P.C.8.1.1 The organisational component carries out the procedures pertaining to the external quality evaluation process, aiming to organise the evaluated study programme as provided by the law.	F	

Summary Table of Performance Indicators – Degree of Fulfillment

Evaluation Domain	Number of Performance Indicators		
	Fulfilled	Partially fulfilled	Unfulfilled
Domain A. Institutional capacity	8	0	0
Domain B. Educational efficacy	14	0	0
Domain C. Quality management	10	0	0
Total	32	0	0

A total of 32 performance indicators were analyzed in the external evaluation report. Following the analysis of the internal evaluation report, the supporting documents and annexes, the supplementary clarifications provided by IOSUD-ULBS, and the evidence collected during the evaluation visit, all 32 indicators were assessed as fulfilled. No indicator was assessed as partially fulfilled or unfulfilled.

VI. Conclusions

Following the completion of the accreditation/maintaining accreditation procedure, the decision of the evaluation panel shall be one of the following:*

a) **maintaining accreditation** (MAC);

The external evaluation confirms that the doctoral study domain Systems Engineering, organized by IOSUD – UT Cluj-Napoca within the Doctoral School of Automation and Computer Science, functions within a coherent institutional, regulatory, and quality-assurance framework. The doctoral domain is supported by appropriate management structures, transparent procedures, qualified doctoral supervisors, adequate administrative support, and access to institutional resources necessary for the organization and coordination of doctoral studies.

The Systems Engineering doctoral domain has a clear academic and research profile, oriented towards relevant directions such as artificial intelligence, advanced computing systems, image processing, data security, automation, human-computer interaction, and related areas of computer science and information technology. The doctoral program is structured in accordance with the requirements for level 8 qualifications, combines an advanced training component with individual scientific research, and supports the development of professional and transversal competences relevant to doctoral-level research. Doctoral

* When the external quality evaluation for accreditation is performed with undergoing the procedure for obtaining a provisional authorisation to operate.

students benefit from supervision, academic guidance and integrity committees, access to research centers and databases, and institutional support for participation in scientific events and publication of research results.

The research infrastructure available to the domain, especially through the Research Centers, supports the scientific activity of doctoral students and supervisors. The scientific results reported for the evaluated period show visibility at national and international level and are consistent with the objectives of the doctoral domain. The domain has also implemented recommendations resulting from the previous external evaluation and has updated its curriculum and procedures in response to changes in the legal framework and to the extension of doctoral studies from three to four years.

The quality-assurance mechanisms applicable to the Systems Engineering doctoral domain are operational and are supported by institutional procedures, annual reporting, student feedback, internal monitoring, and the involvement of academic structures. The clarifications and the evidence analyzed during the evaluation confirmed the application of procedures for monitoring and reviewing the doctoral domain, as well as the involvement of members of the academic community and external stakeholders. At the same time, the panel notes that the documentation of employer and alumni consultation, the visibility of support measures for candidates from vulnerable groups or with special educational needs, and the systematic promotion of mobility and internationalization opportunities can be further strengthened.

The panel identified several development directions that may further strengthen the Systems Engineering doctoral domain. These concern the systematic promotion of short-term international mobility, summer schools, and research visits; clearer communication of opportunities available to doctoral students, including the doctoral yearly grant; clearer public information on support measures for candidates with special educational needs and/or from vulnerable groups; the formulation of a domain-specific internationalization strategy; continued guidance for doctoral students in selecting recognized and academically appropriate publication outlets; clearer Systems Engineering domain-level reporting of student feedback and teaching evaluation results; and the development of institutional guidance on the responsible and ethical use of artificial intelligence in doctoral research, academic writing, evaluation, and thesis preparation.

Following the analysis of the internal evaluation report, the annexes and supporting documents, the supplementary clarifications, the public information available on the UTCN and IOSUD-UTCN websites, and the evidence collected during the evaluation visit, all 32 performance indicators were assessed as fulfilled. Therefore, the ARACIS evaluation panel proposes **maintaining the accreditation** of the doctoral study domain **Systems Engineering** at IOSUD – Technical University of Cluj-Napoca.

VII. Annexes