
KEN

2023-2027

DOCTORAL SCHOOL

EDUCATION QUALITY REPORT

Szkoła Doktorska IPPT PAN

Instytut Podstawowych Problemów Techniki Polskiej Akademii Nauk



Name and seat of the doctoral school

Szkoła Doktorska IPPT PAN

Evaluation period

10/1/19–12/18/24

Name and seat of the entity that is responsible for running the doctoral school

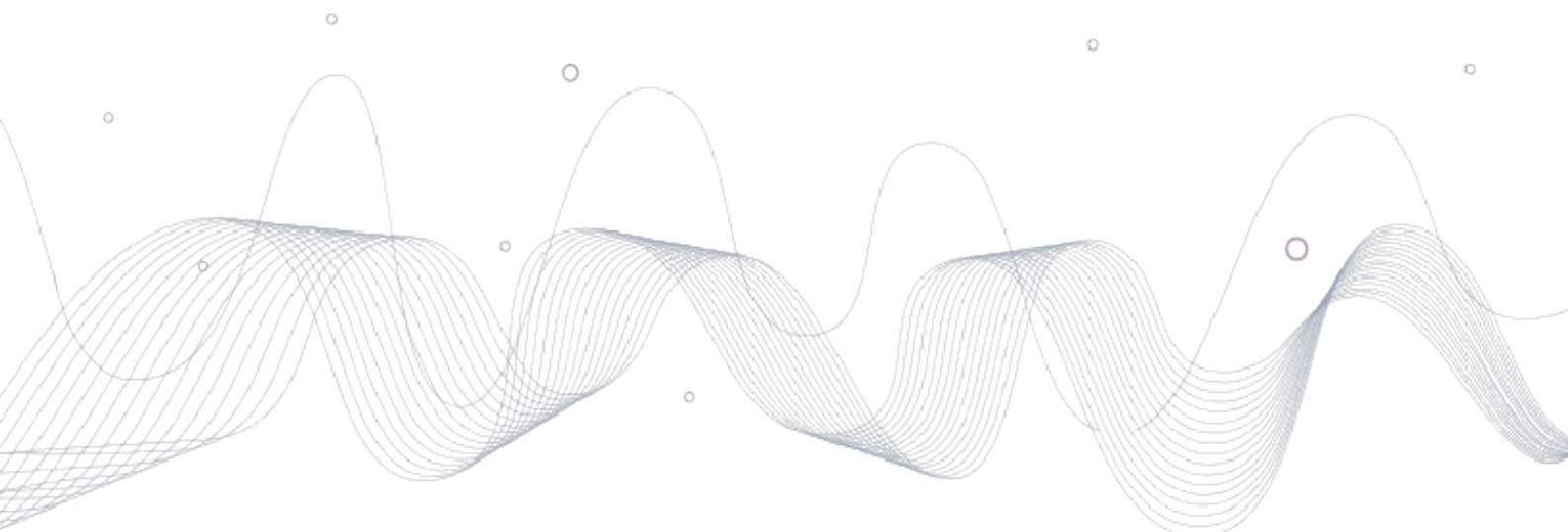
Instytut Podstawowych Problemów Techniki Polskiej Akademii Nauk

Entities that jointly run the doctoral school (when conducted jointly)

-

Date of report

3/10/25



Composition of the evaluation team:

Chairman:

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I. GENERAL INFORMATION ON THE DOCTORAL SCHOOL

Name of doctoral school	Szkoła Doktorska IPPT PAN
Date of establishment	2019
Date of commencement of education at doctoral school	10/1/19
Entity cooperating in the conduct of education (this does not refer to entities co-founding a doctoral school)	-
Domains of study	Engineering and technology (from: 01-01-2018)
Discipline(s) of science or art in which training is provided	biomedical engineering (from: 01-01-2018) automation, electronics and electrical engineering (from: 01-01-2018 to: 10-11-2022) information and communication technology (from: 01-01-2018) materials engineering (from: 01-01-2018) mechanical engineering (from: 01-01-2018)
Name/scope of the education programme	Study Programmes of the Doctoral School of IPPT PAN
Number of instructors	0
Number of doctoral students undergoing training at the doctoral school (as of 3/10/25)	31
Number of supervisors in terms of guidance in preparing doctoral dissertations (as of 3/10/25)	20
Number of auxiliary supervisors in terms of guidance in preparing doctoral dissertations (as of 3/10/25)	16

II. INFORMATION ON THE INSPECTION AND ITS COURSE

The site visit to the Doctoral School of IPPT PAN took place on May 14, 2025. All members of the KEN evaluation team participated in the visit. The agenda was agreed in advance with the authorities of the Doctoral School and included a series of meetings with representatives of the unit.

The schedule of the visit was as follows:

08:00-09:00 - Inaugural meeting with the authorities of the Doctoral School and the Institute.
Number of participants from the IPPT PAN Doctoral School: 3 persons.

09:00-11:00 - Meeting with the team responsible for preparing the self-assessment report and the administrative staff of the Doctoral School.
Number of participants from the IPPT PAN Doctoral School: 10 persons.

11:25-12:30 - Meeting with supervisors, lecturers, and members of the Scientific Councils.
Number of participants from the IPPT PAN Doctoral School: 13 persons.

12:30-13:15 - Lunch break.

13:15-13:45 - Internal meeting of the evaluation team (document analysis, summary of meetings held).
No participants from the IPPT PAN Doctoral School.

13:45-14:45 - Meeting with doctoral students and representatives of the Doctoral Students' Council.
Number of doctoral students from the IPPT PAN Doctoral School: 7 persons.

15:00-15:30 - Internal session of the evaluation team (formulation of conclusions).
No participants from the IPPT PAN Doctoral School.

15:30-16:30 - Final meeting with the authorities of the IPPT PAN Doctoral School.
Number of participants from the IPPT PAN Doctoral School: 3 persons.

16:30-17:00 - Summary and conclusion of the visit.

During the visit, the evaluation team was granted full access to the documentation and to the research and teaching infrastructure of the Doctoral School. Meetings were held in conference rooms and designated workspaces adapted for document analysis. All scheduled meetings took place as planned and included representative participants from the management, supervisors, teaching staff, administrative personnel, and the doctoral student community.

The evaluation team assessed the organization and substantive course of the visit positively and noted the openness of the Doctoral School's authorities to dialogue and the implementation of recommendations.

III. COLLABORATION BETWEEN THE ENTITY AND THE DOCTORAL STUDENT SELF-GOVERNMENT

The Doctoral School of the Institute of Fundamental Technological Research of the Polish Academy of Sciences (IPPT PAN) maintains systematic and effective cooperation with the Doctoral Students' Council. This collaboration is both institutional and operational in nature, encompassing activities related to education as well as organizational and integration aspects. Representatives of the Doctoral Students' Council participate in key decision-making bodies of the school, such as recruitment committees, the Education Committee, and doctoral progress reviews, including the public part of the mid-term evaluation. Their input is taken into account in the consultation and review processes concerning the curriculum. This cooperation results in the regular adjustment of the educational program to doctoral students' needs—for example, actions were taken in response to suggestions regarding the unification of ECTS points across semesters and the expansion of elective course offerings. Discussions with the school's authorities are ongoing in this regard.

Doctoral students positively evaluate the structure of the program, including the division into compulsory and elective courses. The school also responds to the needs of specific groups of students, implementing solutions that facilitate participation in classes for those pursuing industrial PhDs.

The Council also conducts evaluations of teaching quality through doctoral student surveys. The results serve as the basis for the annual IPPT Director's Awards for outstanding teaching performance. The school's authorities are open to suggestions and concerns raised by doctoral students, which ensures efficient communication and the resolution of individual issues.

Despite the lack of a separate budget for the Doctoral Students' Council, the school provides financial support for doctoral initiatives—both in terms of integration activities (e.g., picnics, social events) and academic endeavors. The Council may apply for funding directly to the IPPT Director. During the site visit and within ongoing collaboration, two important postulates were raised: the establishment of a separate office for the Doctoral Students' Council and the improvement of the information system regarding available forms of support—both financial and organizational.

These areas require further action from the school's leadership.

The high quality of cooperation with the Doctoral Students' Council is reflected in numerous distinctions awarded to the IPPT PAN Doctoral School by the National Representation of Doctoral Students. In 2023, the institution received, among others, the title of the most pro-doctoral PAS doctoral school.

Good Practices:

1. An effective model of cooperation with the Doctoral Students' Council, ensuring representation in decision-making bodies and real influence on the functioning of the doctoral school.
2. Support for doctoral students' integration and academic initiatives, enabling project funding without the need to establish a separate budget—while maintaining transparent application and reporting procedures.

Recommendations:

1. Establish a dedicated office space for the Doctoral Students' Council to facilitate organizational activities and improve visibility and accessibility of its representatives to the doctoral community.

2. Improve the communication system regarding available forms of support (both financial and organizational) by creating an integrated, regularly updated online information platform.
3. Harmonize the number of ECTS points across semesters and expand the elective course offering in line with the needs of doctoral students.

IV. INFORMATION ON THE DOCTORAL SCHOOL TO WHICH THE STATUTORY CRITERIA APPLY

- **The adequacy of the education programmes and individual research plans with respect to the learning outcomes for qualifications at level 8 of the PQF and their implementation:**

The educational program at the IPPT PAN Doctoral School is aligned with the requirements defined for Level 8 of the Polish Qualifications Framework (PRK). The learning outcomes assigned to the three main areas-knowledge, skills, and social competences-are achieved by doctoral students through the implementation of the Individual Education Program (IPK), the Individual Research Plan (IPB), and participation in scientific and teaching activities. The curriculum is based on a set of compulsory courses, a minimum of three elective courses, scientific activity (including an annual presentation at the institute seminar), participation in summer schools or research internships, and involvement in the national and international academic community. The program is implemented with flexibility, allowing students to benefit from educational offerings of other academic institutions, including the Warsaw University of Technology and the University of Warsaw.

Compulsory courses include, among others, Selected Topics in Mathematics and Fundamentals and Applications of Tensor Calculus in Continuum Mechanics. For doctoral students in mechanical and materials engineering disciplines, an additional course in continuum mechanics is required. For other disciplines, an individual selection of courses is permitted, subject to approval by the Head of the Doctoral School in consultation with the supervisor(s).

Courses are delivered in Polish or English, depending on needs, and may also be conducted at partner institutions. A minimum of three doctoral students is required to open a given elective course.

All courses are assigned ECTS credits. However, a clear minimum number of ECTS credits required to complete the doctoral training has not been established. This may result in unequal workload distribution among doctoral students and a lack of transparency in program requirements. The need to introduce a clearly defined ECTS threshold was emphasized by both experts and doctoral students during the evaluation meeting.

Both the Individual Education Program and the Individual Research Plan form the basis of the learning process in line with PRK Level 8. The IPB, developed within the first 12 months of study, includes a description of the research topic, research questions or hypotheses, objectives and methodology, a plan for preparing the doctoral dissertation, and a timeline of research activities (e.g., publications, conference participation, grant applications). The IPB template is standardized and subject to evaluation by the supervisor(s) and the IPPT PAN Scientific Council. Documents reviewed by the expert panel were found to be complete, substantive, and well-adapted to the specifics of the research projects.

The mid-term evaluation and ongoing progress monitoring allow for verification of IPB implementation and the achievement of learning outcomes. The interdisciplinary nature of research projects, typical for IPPT PAN, is treated as an added value and is applied in both teaching and research practice.

Course syllabi for compulsory and elective subjects are publicly available and include basic information: prerequisites, objectives, course content, learning outcomes, methods of learning outcome verification, recommended literature, and student workload. The syllabi specify methods of verification (e.g., exam, test, project assessment), but do not always contain clear evaluation criteria. In particular, there is a lack of explicit minimum thresholds for knowledge, skills, and competences required to pass a course. Additionally, some descriptions of learning outcomes contain vague or general terms (e.g., “knows,” “is able to”), which hinder objective assessment. Experts unanimously recommend revising them using measurable and verifiable

operational verbs.

A revised version of the program, compliant with MEiN regulations and the Law on Higher Education and Science, has been adopted by the Education Committee, reviewed by the Doctoral Students' Council, and approved by the Scientific Council. Its implementation is planned for the next academic year.

Good Practices:

1. Maintaining the interdisciplinary nature of research and flexibility in course selection, while ensuring clear and consistent program requirements for all doctoral students.
2. High standards in the preparation of Individual Research Plans (IPB), including the practice of their evaluation by the Scientific Council and the requirement to complete the IPB within the first two semesters of study.

Recommendations:

1. Clearly define the minimum number of ECTS credits that doctoral students must earn through coursework and academic activities to complete their training at the IPPT PAN Doctoral School. These requirements should align with Level 8 learning outcomes of the Polish Qualifications Framework.
2. Refine the learning outcomes in course syllabi by eliminating vague or ambiguous statements. Measurable operational verbs should be used, such as: defines, describes, analyzes, compares, applies, designs, evaluates, justifies.
3. Supplement course syllabi with specific academic assessment criteria, including minimum requirements for a passing grade that directly correspond to the assigned learning outcomes. This will increase transparency and objectivity in the evaluation process.
4. Consider implementing a mechanism for monitoring the equivalence of workload among doctoral students in achieving learning outcomes. This could support greater transparency and fairness in the educational process.

- **The method of assessing the learning outcomes for qualifications at level 8 of the PQF:**
 The IPPT PAN Doctoral School applies a broad and diverse set of methods for verifying learning outcomes, aligned with the qualification requirements for Level 8 of the Polish Qualifications Framework (PRK). The adopted approach includes both formal elements and activities tailored to the individual learning pathway, in line with the master-apprentice model embraced by the institution.
 The verification of learning outcomes is conducted at several levels and stages of education, including:
 1. First-Year Doctoral Students' Scientific Session, held after the second semester. This is the first formal assessment of scientific and teaching progress, conducted by the Committee for Scientific Staff Education of the IPPT PAN Scientific Council. The evaluation enables an initial verification of the extent to which the expected learning outcomes in knowledge, skills, and social competences have been achieved.
 2. Approval of the Individual Research Plan (IPB) - a document including the research topic, objective, research hypotheses, timeline of activities, and the doctoral student's scientific development plan. The IPB is developed within the first two semesters and undergoes review by the supervisor, an assessment committee, and final approval by the IPPT PAN Scientific Council. It serves as a key reference point for further progress evaluation.
 3. Mid-term Evaluation Examination, conducted by an appointed committee and approved by the Scientific Council, constitutes a key moment for verifying the alignment of the IPB implementation with program requirements and the achievement of learning outcomes. Both the advancement of research work and the quality of scientific and teaching achievements are analyzed.
 4. Assessment of course completion, in accordance with course syllabi. Each course ends with a pass or examination, and the forms of verification (oral exam, test, project, quiz, presentation, etc.) are adapted to the course specifics. Syllabi are accessible to doctoral students and map learning outcomes to the three PRK domains: knowledge, skills, and social competences.
 5. Verification of non-teaching scientific and developmental activities, such as:
 - participation in national and international scientific conferences,
 - obtaining a research grant (as leader or team member),
 - organization of scientific or science popularization events,
 - completion of research internships, teaching placements, or industry internships.
 6. Annual progress evaluation - doctoral students are required to submit documentation confirming completion of coursework and other activities included in their Individual Education Program.
 7. Ongoing observation of progress by the supervisor or academic advisor, reflected in opinions prepared for scientific sessions and the mid-term evaluation. Although informal, this is an important source of information on research progress and the development of the doctoral student's competences.
 The learning outcome verification system is flexible and enables doctoral students to demonstrate achievements beyond traditional teaching formats. Participation in practical activities, publications, public presentations, or research projects serves to document compliance with the requirements of PRK Level 8.
 At the same time, experts highlighted the need for more structured documentation of informal assessment practices and clearer grading criteria in the program documentation (e.g., course syllabi). In particular, there is a lack of precise academic evaluation criteria clearly linked to the

described learning outcomes.

Good Practices:

1. A model of diversified forms of learning outcome verification, allowing for their achievement through scientific, teaching, and public engagement activities. This flexibility supports the development of practical competences in doctoral students and is consistent with the requirements of PRK Level 8.
2. The master-apprentice model as the foundation of the education and assessment process, while maintaining a balance between individual approaches and uniform, measurable, and transparent educational standards.

Recommendations:

1. Clarify the grading criteria in program documentation, especially in course syllabi. In addition to the methods of verification (e.g., exam, project), specific academic requirements should be outlined for a passing grade. It is also advisable to define minimum thresholds for knowledge, skills, and competences corresponding to a grade of 3.0.
2. Standardize the documentation and archiving of informal assessment methods, such as supervisor feedback or ongoing progress updates. The introduction of a systematic form or periodic report is recommended.

- Qualification of academic teachers and academic staff employed at the doctoral school:**
 Teaching activities and academic supervision at the IPPT PAN Doctoral School are carried out by highly qualified academic staff. Supervisors and course instructors are recognized experts in their respective disciplines, with significant scientific achievements and experience in leading both national and international research projects. They are professionally active and well-regarded in academic communities.
 The IPPT PAN Doctoral School also provides opportunities for participation of external experts, including international lecturers. For example, Dr. Hab. H. Darban and Dr. M. R. Hajidehi are among those involved in the teaching process. Additionally, based on cooperation agreements with the University of Warsaw and the Warsaw University of Technology, doctoral students may attend courses conducted at these institutions. This form of collaboration broadens the educational offer and provides access to a wider range of specialists, which is especially important in the context of internationalizing the educational process.
 The operational model of the Doctoral School is based on the individualization of the learning process, which is also reflected in the recruitment system. The initiative for cooperation comes from the prospective academic supervisor, who, prior to the entrance exam, agrees with the candidate on the research topic and the terms of cooperation. This preliminary agreement facilitates matching the dissertation topic with the supervisor's expertise and supports the effective implementation of the doctoral training.
 Each course at the Doctoral School has an assigned syllabus, which is approved by the Head of the Doctoral School. The syllabus includes educational objectives, course content, assigned learning outcomes, and methods for their verification.
 Despite the high qualifications of the staff, experts have noted the absence of a formal system for evaluating teaching quality. The school does not currently implement procedures such as class observations, systematic semester surveys, or programs for improving teaching skills. According to the School's leadership, this is due to the small group sizes and the individualized nature of the training process. Nevertheless, an existing mechanism for verifying teaching quality is the annual award granted by the Director of IPPT PAN for outstanding teaching. Recipients of this award are selected partly based on doctoral student survey results conducted by the Doctoral Students' Council.
 Teaching activities are additionally remunerated, which serves as a motivational element for teachers. However, no internal training system or tools for supporting the development of teaching competences have been introduced.
Good Practices:
 1. A motivation system that includes annual awards for outstanding teaching performance, granted by the Director of IPPT PAN, with doctoral students' opinions considered as part of the teaching quality evaluation process.
 2. High academic standards of the teaching and research staff, reflected in the currency of their scientific output and their active engagement in ongoing research projects.**Recommendations:**
 1. Introduce a simplified and regular system for evaluating teaching quality, for example in the form of anonymous electronic surveys completed by doctoral students at the end of each semester. These opinions could serve as a valuable source of feedback for instructors and the leadership of the Doctoral School.
 2. Consider implementing mechanisms to support the development of teaching competences among academic staff, such as short methodological workshops, teaching mentorship, or individual consultations with experts in academic pedagogy.

- **The quality of the admission process:**

The recruitment process for the IPPT PAN Doctoral School is conducted in an open, transparent manner and in accordance with applicable regulations. The recruitment rules are publicly announced, including on the Institute's website. The process is organized by the Recruitment Committee, which is appointed each time by the Director of IPPT PAN. The recruitment procedure is open to both Polish citizens and foreign nationals, including those from outside the European Union and the European Economic Area, under the conditions defined by separate regulations.

The recruitment has a competitive character and consists of three written examinations:

- in mathematics,
- in a subject related to the discipline of the planned doctoral dissertation,
- in English.

The scope of examination topics is made available to candidates in advance, ensuring transparency and equal opportunities. Candidates with disabilities and foreign applicants may take the exams remotely, under conditions ensuring independent work and fairness. In certain cases-especially when recruitment is linked to the implementation of research projects-the examination procedure may include an additional interview to verify specific competencies required for the chosen research topic.

Based on the exam results, a ranking list is prepared, which serves as the basis for admission decisions. The results of the recruitment process are published both on the IPPT PAN website and on the notice board at the Institute's headquarters.

Representatives of the Doctoral Students' Council participate in the recruitment process as full voting members of the committee. This is considered a good practice, enhancing transparency and doctoral student engagement in the functioning of the School.

The School undertakes activities aimed at promoting its educational offer among international candidates. A key element of this is direct contact with potential supervisors and the possibility of participating in international research grant competitions. Foreign candidates constitute a significant proportion of those admitted, which reflects the School's openness to internationalization.

The website of the Doctoral School is available in both Polish and English. However, the full recruitment and program documentation-including the education regulations, admission rules, and curriculum-is only available in Polish through the Public Information Bulletin (BIP). This may pose a barrier for international applicants by limiting access to comprehensive information.

Despite the high quality and transparency of the procedures, experts have noted the absence of systematic analysis of the recruitment process with the aim of its continuous improvement. There is no indication that the School conducts formal evaluations of recruitment effectiveness, investigates the reasons for candidates' withdrawal (including international candidates), or collects feedback from applicants.

Good Practices:

1. Involvement of Doctoral Students' Council representatives in recruitment committees, which enhances process transparency and strengthens doctoral student engagement in the functioning of the Doctoral School.
2. Efforts to attract international candidates, such as expanding English-language promotional materials, conducting direct informational activities, and active participation of IPPT PAN in international academic and research initiatives.

Recommendations:

1. Introduce regular evaluation of the recruitment process, including:
 - analysis of recruitment effectiveness (e.g., number of applicants who complete the process),
 - analysis of reasons for candidate withdrawals, including international candidates,
 - assessment of the effectiveness of promotional activities,
 - collection of feedback from candidates after the recruitment process (e.g., via short surveys).
2. Make the full recruitment and program documentation available in English, to increase accessibility for international applicants and to support the internationalization of the Doctoral School.

- **The quality of scientific or artistic guidance, and support in research:**

Academic supervision at the IPPT PAN Doctoral School is provided by highly qualified academic staff, consisting primarily of independent researchers employed at the Institute. Supervisors have well-recognized scientific achievements, up-to-date publications, and experience in leading both national and international research projects. Their scientific activity and professional recognition contribute to the high quality of doctoral education and facilitate the integration of doctoral students into the research environment of IPPT PAN.

The supervision model is based on a partner-like relationship between supervisor and doctoral student, characterized by accessibility and continuous collaboration, without the need to set formal consultation hours. This approach proves effective for doctoral students conducting research both at IPPT PAN and externally-for instance, as part of industrial doctorate programs.

In the case of interdisciplinary research, two supervisors may be appointed to provide subject-specific support from different academic fields. Assistant supervisors may also be involved in the research process, taking on technical, organizational, and training roles, thereby preparing for future supervisory responsibilities. In some cases, co-supervisors from renowned international institutions may be included, which further strengthens the international dimension of doctoral education.

Doctoral students have access to IPPT PAN's research infrastructure, including modern laboratories, scientific equipment, databases, licensed software, and financial resources for research mobility. They participate in research teams, are involved in projects carried out at the Institute, and have opportunities to consult with both national and international experts. They also take part in regular open scientific seminars at IPPT PAN, conducted in English and covering current research topics in mechanics, materials engineering, and ultrasound applications. These seminars often feature invited researchers from both Polish and international scientific institutions.

As part of the organizational structure at IPPT PAN, each doctoral student is supervised by a doctoral committee, which monitors the implementation of the Individual Research Plan (IRP). Additionally, compliance with the IRP and the quality of supervision are subject to mid-term evaluation. In the event of conflicts, mediation procedures are available and involve relevant bodies, such as the Education Committee, the doctoral committee, or the ombudsperson for academic staff.

The School offers a flexible approach to class scheduling, especially for doctoral students who are parents. Participation in classes in hybrid or remote formats is possible. The IPPT PAN infrastructure is accessible to persons with disabilities and includes elevators, ramps, wide hallways, and appropriate sanitary facilities.

Despite many positive aspects, experts have identified the lack of formalized mechanisms for monitoring and improving the quality of supervision. There are no mentoring programs, training systems for supervisors, or observation of supervisor-student interactions.

Supervisors remain the main source of information on academic development opportunities, which may limit access to support when communication is less effective. The rules for changing a supervisor are known, but access to this information could be improved.

Good Practices:

1. High qualifications and scientific activity of supervisors - supervision is provided by recognized experts with current scientific achievements and experience in leading research projects, contributing to the quality of education and integration of doctoral students into IPPT PAN's academic life.

2. Partner-based supervisor-doctoral student relationship, characterized by accessibility, individualized support, and ongoing cooperation - effective even for students pursuing doctoral research outside the Institute.
3. Interdisciplinary supervision options, including two academic supervisors, assistant supervisors, and international co-supervisors - which enhance subject-specific support and foster internationalization.
4. Active involvement of doctoral students in the academic life of the Institute, including access to research infrastructure, participation in projects and seminars, and opportunities for expert consultations.

Recommendations:

1. Introduce a periodic, anonymous evaluation of the supervisor-doctoral student relationship to gather feedback on the quality of academic supervision. This could help identify potential issues early and improve the doctoral experience.
2. Increase the visibility of procedures for changing supervisors, e.g., by publishing clear guidelines on the Doctoral School's website, to enhance transparency and the sense of security for doctoral students.
3. Consider implementing a structured mentoring program for new supervisors and assistant supervisors to support the long-term quality of academic supervision.
4. Design basic methodological training for supervisors, covering topics such as managing the supervisor-student relationship, research ethics, and support for mobility and internationalization.
5. Expand the information channels available to doctoral students by introducing systematic tools (e.g., a newsletter or online portal) that provide access to information about grants, conferences, mobility opportunities, and development programs, regardless of the level of supervisor involvement.

- **The reliability of the midterm evaluation:**

The mid-term evaluation at the IPPT PAN Doctoral School is conducted in accordance with the provisions of the Law on Higher Education and Science (PSWiN) and the School's internal regulations (§14-17). The procedure is clearly defined and applied uniformly to all doctoral students. Its purpose is to verify progress in the implementation of the Individual Research Plan (IRP) and to assess the scientific and teaching achievements of the doctoral student after the second year of study.

Procedure of the mid-term evaluation:

1. At the request of the Standing Committee of the IPPT PAN Scientific Council, two committees are appointed: the Mid-Term Evaluation Committee and the Doctoral Committee (partially overlapping in membership). The committees are formed with respect to the scientific discipline and where interdisciplinary work is involved include specialists from multiple fields. At least one external expert (from outside IPPT PAN) is included to enhance objectivity.
2. The mid-term evaluation takes place between the 21st and 24th month of the program. It includes:
 - submission by the doctoral student of the following documents: the IRP, supervisor's opinion, list of achievements and publications (with an indication of those to be included in the doctoral dissertation);
 - a public seminar, during which the doctoral student delivers a 30-45 minute presentation on research progress (with mandatory attendance by committee members);
 - a closed discussion with the committee regarding the IRP and the dissertation concept;
 - a closed committee meeting during which the final decision is made based on the submitted documents, the presentation, and the discussion.
3. The evaluation result is communicated to the doctoral student, the IPPT PAN Scientific Council, and the Head of the Doctoral School. Each evaluation includes a substantive justification, references the implementation of the IRP, and provides a qualitative assessment of the doctoral student's achievements.
4. If the committee raises concerns about the presented outcomes, it may issue recommendations and require the doctoral student to address them within three months. A re-evaluation is then conducted.
5. In the case of a negative decision, the doctoral student has the right to appeal, which ensures that their rights are respected. The appeals procedure is described in the School's regulations.

Additional elements of the procedure:

1. The evaluation committee may use a set of control questions (approximately eight), answered with "yes"/"no". Although this tool is considered useful, experts noted the lack of formally defined pass thresholds-there is no clarity on how many "no" answers result in a negative evaluation, nor which questions are considered critical.
2. The final assessment is issued in writing and includes a justification. However, experts highlighted the need to standardize its structure and content-each evaluation should include a summary of IRP implementation, identification of strengths and weaknesses, and specific recommendations.
3. Representatives of the Doctoral Students' Council may participate in the public part of the evaluation, which is a good practice enhancing transparency and doctoral student engagement.

Conclusions:

The organization and implementation of the mid-term evaluation at the IPPT PAN Doctoral School are consistent with current legal requirements and demonstrate a high level of integrity. The involvement of external experts, a transparent procedure, and the right to appeal ensure compliance with good academic practices. The system enables ongoing monitoring of doctoral student progress and the implementation of corrective measures when necessary.

Good Practices:

- Participation of Doctoral Students' Council representatives in the public part of the mid-term evaluation, which supports process transparency, facilitates dialogue, and fosters trust between doctoral students and the School's leadership.

Recommendations:

1. Clarify the rules of the mid-term evaluation regarding control questions, including:
 - defining the number of "no" answers that result in a negative outcome (e.g., "three times no"),
 - identifying critical questions, the failure to meet which results in automatic failure.
2. Introduce a requirement for a written and precise justification of each "no" answer, to increase transparency and help doctoral students better understand the committee's decisions.
3. Standardize the format of the final mid-term evaluation report, which should include:
 - a summary of IRP implementation,
 - an assessment of scientific output and research activity,
 - an outline of strengths and weaknesses,
 - recommendations for further development,
 - a clear final conclusion of the committee.

- **Internationalisation:**

The IPPT PAN Doctoral School undertakes a range of activities aimed at internationalization, which is one of its priority development areas. These activities include the participation of doctoral students in international projects and mobility programs, cooperation with foreign research institutions, and the involvement of international doctoral students and academic staff.

Participation in International Projects and Mobility

Between 2019 and 2024, doctoral students took part in over 20 international projects, including 9 funded from foreign sources, 5 of which were financed by the European Union. Doctoral students were actively involved in these projects, demonstrating their integration into IPPT PAN research teams and the high level of collaboration with international partners. During the reporting period, doctoral students completed four international research internships, participated in five training courses and two summer schools. Since 2024, international mobility has also been supported through participation in the Erasmus+ program, which is considered a positive step toward expanding international opportunities.

Composition and Collaboration with International Researchers

Among the 27 currently enrolled doctoral students, 12 are foreign nationals. From 2019 to 2024, the share of international students remained around 30%, which the Institute considers a minimum threshold to maintain. The IPPT PAN academic staff includes 18 foreign researchers (2 senior researchers and 16 assistant professors), and two international lecturers are also involved in teaching. Among the supervisors is Prof. A. Díaz Lantada from Universidad Politécnica de Madrid. In selected cases, foreign researchers serve as co-supervisors.

Language of Instruction and Publications

Some courses are conducted in English; however, their availability is not systematic and depends on the individual instructors' capabilities. There is currently no unified, structured English-language curriculum available throughout the full study cycle.

Doctoral students at IPPT PAN are the authors of 47 research publications affiliated with international institutions, which confirms their scientific activity and the international reach of their research outcomes.

Gaps and Areas for Improvement

Despite tangible achievements, experts noted the lack of a formal, comprehensive internationalization strategy. Specific issues include:

- the absence of a long-term plan to develop English-language educational offerings,
- the lack of systematic promotional efforts targeting international candidates (e.g., participation in education fairs, collaboration with NAWA, development of dedicated materials in English),
- the absence of tools to support the integration of international doctoral students into the IPPT PAN academic community.

The School's leadership identifies internationalization as an important direction, but existing efforts remain fragmented and are not based on a formally adopted strategic document.

Recommendations:

1. Develop and implement a formal internationalization strategy for the IPPT PAN Doctoral School, including:

- quantitative and qualitative goals regarding the participation of international doctoral students and staff,
- a plan for increasing the number of courses taught in English,
- initiatives to support the development of international research projects involving doctoral

students.

2. Expand the English-language educational offering to ensure access regardless of individual instructors' availability.

3. Intensify promotional activities targeting international candidates, including:

- participation in international education fairs,
- collaboration with the NAWA agency,
- preparation of information and promotional materials in English.

4. Implement tools to support the integration of international students within the IPPT PAN environment, such as a mentoring program, language and administrative support, and integration events.

- **The effectiveness of the doctoral education:**

The Doctoral School at IPPT PAN has been operating since 2019 and functions as a small scientific and educational unit. Between 2020 and 2024, 31 doctoral students were admitted. The educational model is based on individual supervisory care, high academic standards, and long-term implementation of research projects, which is typical for engineering and technical sciences.

Implementation of the Educational Process

By September 2024, 18 doctoral students had undergone mid-term evaluation, all of whom received positive assessments. During the same period, nine doctoral students were scheduled to complete their education cycle, of which three obtained the doctoral degree, while the remaining had their education period extended. In this context, the completion rate stands at 33%. The School's authorities emphasize that the low rate of on-time completions is due to the emphasis on the quality of research, which often requires 5-6 years to complete a dissertation.

The Doctoral School has not recorded any cases of negative mid-term evaluations. Individual research plans are compliant with level 8 of the Polish Qualifications Framework and are subject to continuous monitoring. Progress is reviewed by doctoral committees, in accordance with established procedures, and the process is consistently implemented.

Doctoral Student Activity and Career Outcomes

Doctoral students participate in research projects-including international ones-publish research results, attend seminars, and engage in science popularization activities. Despite attempts to apply for research grants, no successes have been reported so far.

The School does not yet conduct systematic tracking of alumni career paths. Internal observations suggest that some graduates find employment in industry, while others continue research at IPPT PAN. The first three graduates of the doctoral school now work outside the academic sector. However, this data is only approximate and does not provide a sufficient basis for drawing comprehensive conclusions.

Assessment of Effectiveness and the Need for Internal Evaluation

The current statistical data on the effectiveness of education is limited and essentially concerns only one cohort. Due to the short operational history of the School and the relatively small number of doctoral students, the current success rate cannot be considered fully representative. The School's leadership declares a goal of reaching an 80-90% success rate, which it considers realistic based on the previous experience of the IPPT PAN Doctoral Studies program.

There are no formal tools for evaluating the quality of education by the doctoral students themselves. No systematic evaluation surveys or feedback analyses are conducted regarding the educational process and supervisory care.

Good Practice

- Individualized approach to education, allowing the study path to be tailored to the needs and research profile of each doctoral student. Documenting the outcomes of such efforts may further increase transparency and enable an evaluation of the effectiveness of the adopted model.

Recommendations

1. Implement a system of evaluation surveys for doctoral students, allowing assessment of the quality of education, the level of supervisory support, and the organization of the educational process. The collected data should be analyzed regularly and used to improve the functioning of the School.

2. Establish a graduate career tracking system, in order to gain a fuller picture of the effectiveness of education and its alignment with labor market and research sector needs.
3. Strengthen support for doctoral students applying for external funding, through the organization of training, grant mentoring, and the development of a project consulting system.

V. FINAL OPINION AND RECOMMENDATIONS

Final assessment: positive.

The evaluation team does not recommend an earlier follow-up evaluation.

Based on the analysis of documentation, observations, and interviews conducted during the visit, the evaluation team concludes that the Doctoral School of IPPT PAN operates in compliance with formal requirements and provides appropriate conditions for doctoral-level education. The team appreciated the high academic standards of the faculty, the openness of the school authorities to dialogue, and the individual approach to doctoral students, including international and industrial doctorate candidates.

At the same time, the team formulated the following set of recommendations aimed at further improving the organization and quality of the doctoral training process:

1. Standardization and organization of administrative documentation – in particular, ensuring legible signatures, the use of official stamps, and consistent document templates.
2. Clear and precise description of learning outcomes in course syllabi – especially regarding the type of classes and final requirements, to ensure transparency and comparability across courses.
3. Harmonization of ECTS credit allocation rules – introduction of clear guidelines specifying the minimum number of credits required to complete the doctoral programme, as well as the number of credits assigned to specific types of activities (courses, publications, summer schools, mobility)..
4. Implementation of systematic teaching evaluations by doctoral students – e.g., through anonymous surveys, with mechanisms to respond to the results.
5. Provision of a dedicated office for the Doctoral Students' Council – creating an organizational space to support student governance and integration initiatives.
6. Improvement of internal communication with doctoral students – particularly regarding available funding opportunities, international mobility, and grant offers.
7. Increased access to licenses for specialized software – tailored to the needs of doctoral students conducting advanced research.
8. Improvement of mid-term evaluation procedures – ensuring consistent, substantive justifications for the assessments and transparent documentation of the evaluation process.
9. Strengthening the promotion of the Doctoral School within the national academic community – emphasizing its high scientific standards, interdisciplinarity, and personalized approach to doctoral education.
10. Support for doctoral students in applying for individual research grants – through mentor guidance, grant proposal workshops, and application reviews.

VI. ASSESSMENT AND REASON

Final assessment
positive

Reason:

The IPPT PAN Doctoral School meets the requirements specified in the applicable regulations on the quality of education at level 8 of the Polish Qualifications Framework (PRK). The curriculum and the structure of individual research plans are coherent, and the education process is flexible and well-adapted to the interdisciplinary profile of the Institute. Verification of learning outcomes takes place at many levels and stages, and its forms are adequate to the program objectives.

The evaluation team did not identify any significant irregularities in the functioning of the IPPT PAN Doctoral School. Although some issues require modification or explanation (including documenting evaluation criteria, consistency of records and access to information for foreign candidates), they do not significantly affect the positive perception and overall assessment of the School's activities. The recommendations indicate specific areas requiring improvement.

The positive assessment is also supported by the high quality of the scientific staff, the availability of research infrastructure and the model of cooperation in scientific supervision. The School provides an environment conducive to the scientific and professional development of doctoral students, including in the context of internationalization.

In light of the positive evaluation of the functioning of the Doctoral School and the lack of significant deficiencies, the Evaluation Team considered it justified to leave the standard date for the next evaluation.

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