SELF-ASSESSMENT REPORT ON THE QUALITY OF EDUCATION IN THE DOCTORAL SCHOOL

Szkoła Doktorska IPPT PAN

Instytut Podstawowych Problemów Techniki Polskiej Akademii Nauk

Evaluation period: 01-10-2019 to 18-12-2024
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VISITING CARD

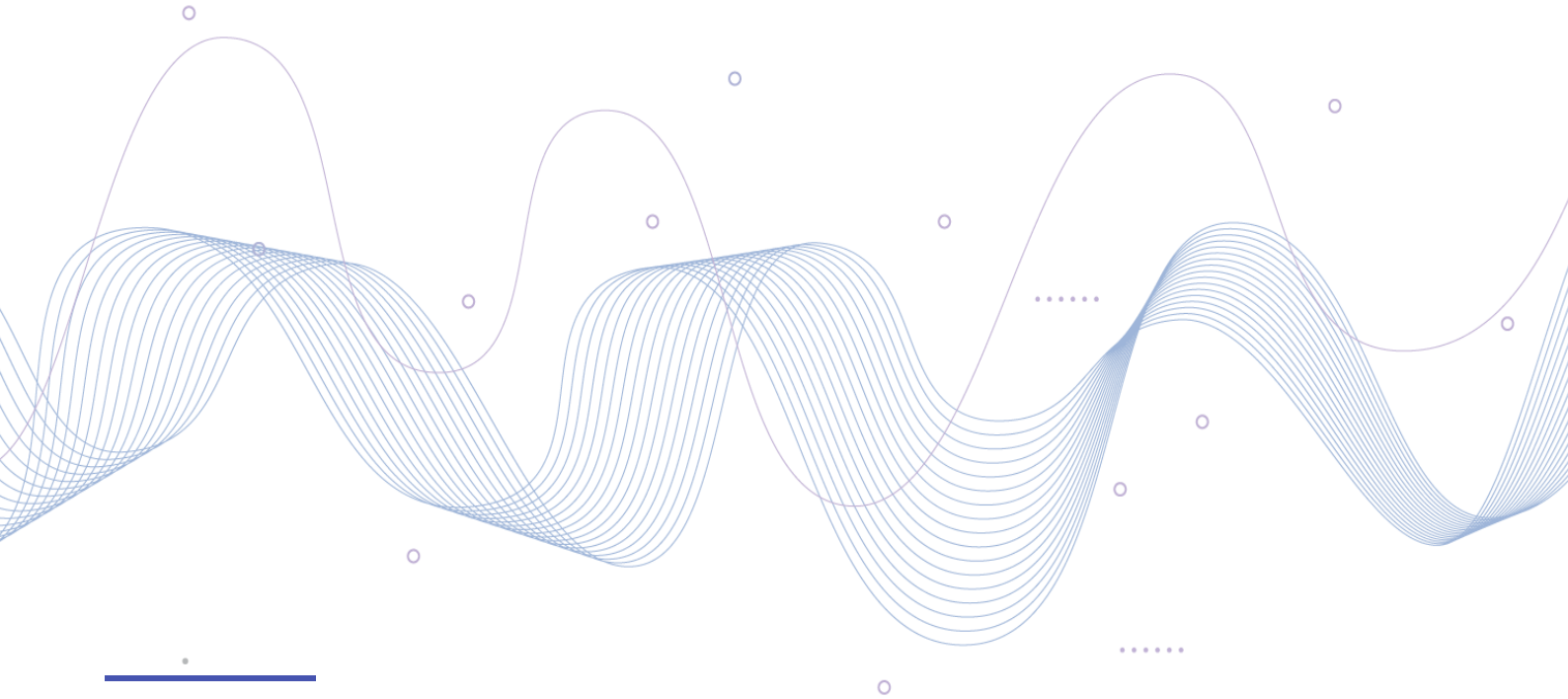
Basic Information about the Doctoral School

Year of Creation

2019

Institution running the doctoral school

Instytut Podstawowych Problemów Techniki Polskiej Akademii Nauk



Field of Education	Education Disciplines
Engineering and technology	biomedical engineering automation, electronics and electrical engineering information and communication technology materials engineering mechanical engineering

Name/Scope of the Education Program (PL)	Name/Scope of the Education Program (EN)
Indywidualny program kształcenia w Szkole Doktorskiej IPPT PAN	Study Programmes of the Doctoral School of IPPT PAN

Characteristics of the Doctoral School

The activity of the Doctoral School of IPPT PAN (SD IPPT PAN) is a continuation of the process of educating doctoral students at IPPT PAN, which has been ongoing since 1968 and previously carried out by the Doctoral Study of IPPT PAN. Owing to this, most of the principles of activity of SD IPPT PAN are based on experience acquired and procedures carefully developed over many years. The mission of SD IPPT PAN is to educate doctoral students, including implementation doctoral students, at the highest possible scientific level, aimed at preparing them both for research work in the academic environment and as outstanding specialists for the needs of the economy, mainly industry.The activities of SD IPPT PAN at the research institute of the Polish Academy of Sciences, i.e. outside universities offering first- and second-cycle higher education studies, impose a strategy of constantly searching for exceptionally talented university graduates from Poland and abroad as candidates for doctoral students. This is done through centrally carried out encouraging campaigns, including with the help of the Promotion Department of IPPT PAN, as well as thanks to numerous individual scientific contacts of research workers of IPPT PAN with domestic and foreign universities. Owing to this, SD IPPT PAN usually admits especially motivated beginner researchers who left their own universities to pursue their doctoral theses at an international level under the supervision of internationally recognized scientists from IPPT PAN. As a result, this gives the SD IPPT PAN a chance to achieve educational efficiency of at least 80-90%, i.e. the same as was observed during the Doctoral Study of IPPT PAN, which operated in identical conditions in this respect. The main advantages of SD IPPT PAN include its high level of scientific research for doctoral theses, comparable to the level at which current analogous works are carried out in leading scientific and research centers in the world. This is proven by the large number of scientific articles published by the doctoral students in prestigious scientific journals, both while writing their doctoral theses and after completing them. Another advantage of SD IPPT PAN is its interdisciplinarity related to the possibility of conducting research and obtaining doctorates in several scientific disciplines. Thanks to this, PhD students of SD IPPT PAN can perform their research on the border of mechanical engineering and computer science, materials engineering and biomedical engineering, mechanical engineering and materials engineering, and on the border of other combinations of these disciplines. Also noteworthy is the highly individual study program at SD IPPT PAN. Regardless of the area of research chosen for the doctoral thesis together with the supervisor, the doctoral student has the opportunity to freely choose teaching activities, including the so-called hard skills that support his/her research, as well as all kinds of soft skills that, during and after his/her studies, may prove to be extremely useful for further professional career development. These activities are conducted by the research staff of IPPT PAN, the permanent offer of which is modified depending on current needs. In addition, doctoral students are free to take part in teaching activities conducted by other academic centers in Warsaw and online anywhere in the world, whenever possible. In addition, PhD students of SD IPPT PAN have extensive opportunities to participate in international and national scientific conferences, various types of specialized courses, summer schools, scientific workshops and other such events, which allows them to present results of their research and compare these results with similar findings of the scientific work of other researchers, and to gain experience necessary to functioning in an academic environment.A distinctive feature of SD IPPT PAN, compared to other doctoral schools in Poland, is the proven and effective form of recruitment adopted on the basis of the long-standing tradition of the Doctoral Study of IPPT PAN in the form of a three-stage entrance examination in mathematics, a major subject corresponding to the scientific discipline of research for the doctoral thesis expected by the candidate, and English language. Based on many years of experience gained at IPPT PAN in this field, it appears that this type of knowledge testing method not only allows for a reliable and effective assessment of the degree of preparation of candidates for doctoral studies at SD IPPT PAN, but also owing to the introduced measurable point system for assessing examination papers, enables the admissions committee to create objective ranking lists necessary to make final decisions regarding the acceptance or rejection of a given candidate. Another feature of the activities of SD IPPT PAN that is worth distinguishing from other doctoral schools is its close cooperation with the Committee for the Education of Scientific Staff of the Scientific Council of IPPT PAN (KK RN IPPT PAN). This committee organizes reviews of the scientific and teaching progress of the first-year doctoral students at the turn of June and July of each academic year. During such a review session, doctoral students, in the presence of their supervisors, present to the Committee the results of the achievements gained during their first 8 months of doctoral studies. On this basis, it is possible to objectively assess the degree of preparation and credibility of the implementation of the Individual Research Plans, which doctoral students are obliged to submit by the end of September, i.e. within the first 12 months of studies, as required by the respective law regulations. Moreover, SD IPPT PAN, together with the KK RN IPPT PAN, organizes mid-term assessment exams, selecting members of the examination committee and the doctoral committee for each doctoral student. Thanks to this cooperation, all procedural issues related to the need to present individual cases during meetings of the Scientific Council of IPPT PAN and when initiating doctoral proceedings are facilitated. Compared to large, central doctoral schools of Polish public universities, SD IPPT PAN is a small doctoral school educating at most several dozen, i.e. 30÷40, doctoral students in each academic year. Such a small number allows each doctoral student to devote relatively much time to consultations not only with supervisors, but also with other research workers from IPPT PAN, with whom it is much easier to establish professional contacts in such conditions. Owing to the numerical ratio of the above-mentioned small number of doctoral students of SD IPPT PAN to the number of research workers of the PAN research institute, a specific intimate atmosphere of a scientific community is created.

Additional Information about the Doctoral School

Educating Staff

Numerical data for the evaluation period

Educating Staff	Instructors	Supervisors	Assistant Supervisors
Number of people	0	20	16

Doctoral Students

Number of doctoral students (total): 31

Recruitment during the evaluation period	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Total
Number of recruited doctoral students	9	8	8	4	5	6	40
Number of doctoral students who completed the doctoral school	2	1	0	0	0	0	3
Number of doctoral students removed from the doctoral student list	2	3	1	0	0	0	6

Mid-term evaluation results	Positive	Negative
Number of Doctoral Students	18	0

Educational Programs	Number of Doctoral Students
Study Programmes of the Doctoral School of IPPT PAN	31

Additional Numerical Data on Doctoral Students

Number of foreign doctoral students	14
Number of doctoral students with disabilities	1
Number of doctoral students in the Implementation Doctorate program	3
Number of doctoral students in the EU program	0
Number of doctoral students employed by the institution running the doctoral school as academic teachers or research staff	0

Graduates

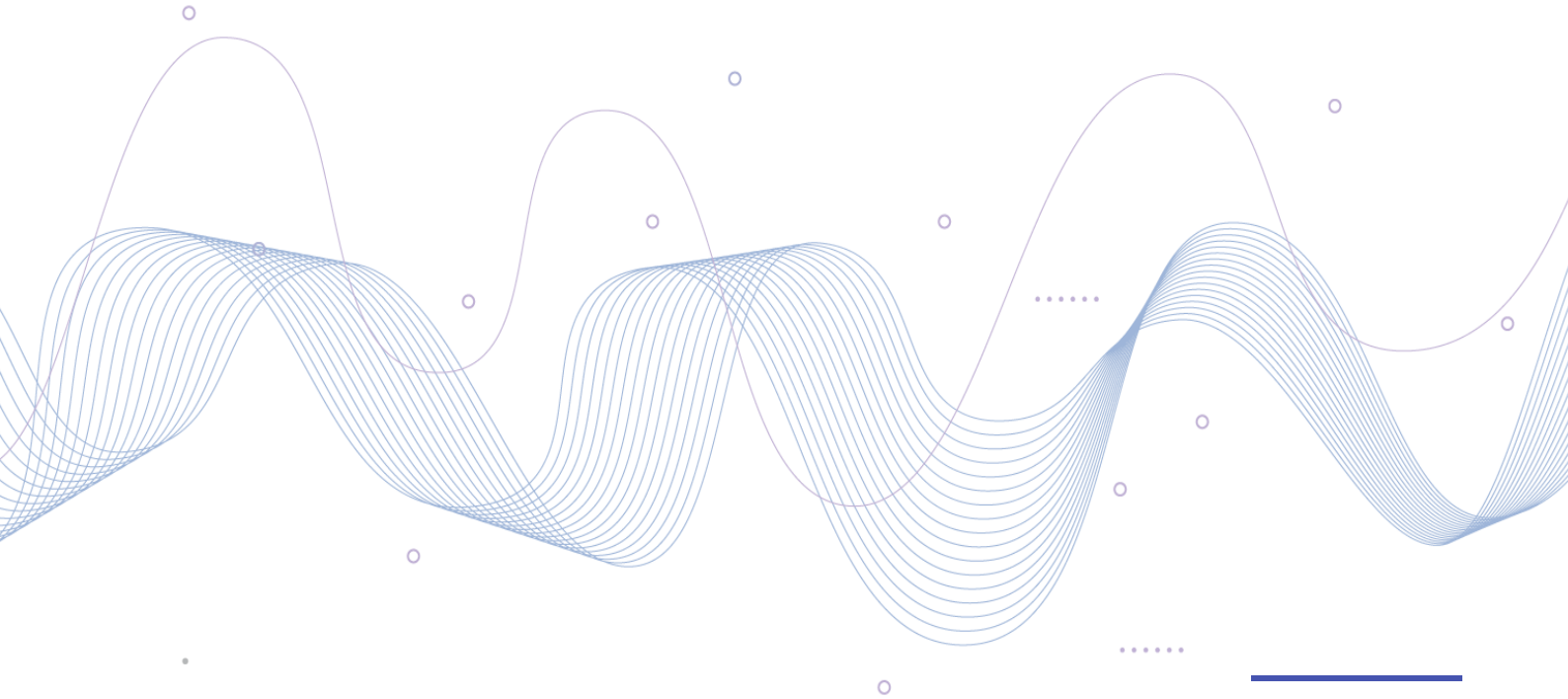
Numerical data for the evaluation period

Number of graduates who applied for initiation of proceedings for the award of a doctoral degree	3
Number of doctoral students who completed the doctoral school	1

INFORMATION ON THE ENTITY'S COOPERATION WITH THE DOCTORAL STUDENTS' COUNCIL

The Doctoral School of IPPT PAN (SD IPPT PAN) cooperates closely with the IPPT PAN Doctoral Students' Self-Government (DSSG). SD IPPT PAN tries to seek the opinion of DSSG on all important issues relating to scientific work and the living situation of doctoral students. This is done in the form of permanent participation of representatives of DSSG in the meetings of the Recruitment Committees for SD IPPT PAN, consisting of the chairman of DSSG, his deputy and the representative of DSSG to the Scientific Council of IPPT PAN, who have the right to vote. Representatives of DSSG are also present as observers during review sessions of the progress of the first-year PhD students of SD IPPT PAN. Moreover, SD IPPT PAN, to the extent possible, supports its doctoral students in all kinds of difficult accidental situations and in organizing various integration initiatives by DSSG, most often in the form of various sports competitions, e.g. on climbing walls, bowling alleys, or other forms of active recreation, usually combined with catering.An objective measure of the satisfaction of the SD IPPT PAN doctoral student community, represented by DSSG, with the study conditions at IPPT PAN are the following awards obtained by IPPT PAN and SD IPPT PAN, funded by the National Council of Doctoral Students as part of nationwide competitions for the most pro-doctoral institute of the Polish Academy of Sciences (PAS): 1. **In 2019, IPPT PAN** achieved the **distinction** "***For high result in the general classification***" in the "PROPAN 2019" competition (cmp.).2. **In 2020 and 2021, IPPT PAN** won **the first prize for the most pro-doctoral institute** in the "PRODOK 2020" cmp..3. **In 2022, IPPT PAN** won **the first prize for the most pro-doctoral Institute** in the "PROPAN 2022" cmp.4. **In 2023, SD IPPT PAN** won **the first prize** "***For the most pro-doctoral doctoral school***" in the "PRODOK 2023" cmp. and the **distinction** "***For above-average activity on the national forum***" in the "PANorama 2023" cmp.

INFORMATION ON THE DOCTORAL SCHOOL GROUPED BY 8 EVALUATION CRITERIA



1. Adequacy of the education program and individual research plans to the learning outcomes for qualifications at PRK level 8 and their implementation

The educational process at the Doctoral School of IPPT PAN (DS of IPPT PAN) consists primarily of conducting scientific research aimed at completing a doctoral thesis and acquiring knowledge by attending various types of classes and participating in summer schools, specialized courses, workshops, scientific conferences, etc. This creates the opportunity to gain the so-called "hard" skills that directly support the performance of research work, and "soft" skills aimed at preparing doctoral students for professional work, both in academic and non-academic environments, mainly corporate or industrial. All these actions result in obtaining many learning outcomes for qualifications at PQF level 8 as defined in the Regulation of the Ministry of Science and Higher Education of November 14, 2018, item 2218 on the characteristics of second-level learning outcomes for qualifications at levels 6-8 of the Polish Qualifications Framework. Namely:The course of elaborating a doctoral thesis consists of conducting theoretical and experimental research, describing the obtained results, studying the necessary scientific literature and drawing appropriate conclusions, setting research goals combined with formulating theses, which ultimately leads to writing a scientific dissertation. Owing to this, the doctoral student acquires qualifications in the field of knowledge, in accordance with the provisions of P8S_WG and P8S_WK, in terms of skills, in accordance with P8S_UW, and in the field of social competences, in accordance with P8S_KK of this Regulation. At the same time, the process of completing a doctoral thesis involves the need to transfer the acquired knowledge and experience in the form of seminar presentations, conference papers and writing scientific articles. Consequently, the doctoral student also acquires qualifications in the field of skills, in accordance with P8S_UW and P8S_WK, and in the field of social competences, in accordance with P8S_KK and P8S_KR of the above-mentioned Regulation.Taking part in teaching activities covering both "hard" and "soft" skills also leads to acquiring qualifications at PQF level 8. In the case of teaching classes offered by the DS of IPPT PAN, the qualifications that a doctoral student acquires are specified in detail in the syllabuses of individual subjects, which are posted on the IPPT PAN website as part of the school's permanent teaching offer. The description of each qualification in the syllabus is related to the relevant definitions of qualifications at PQF level 8 contained in the above-mentioned. Regulation and in the modified Education Program of the DS of IPPT PAN approved by the Scientific Council of the IPPT PAN.During studies at the DS of IPPT PAN, the doctoral student, working with his/her supervisor or supervisors or supervisor and auxiliary supervisor as well as with other research workers and PhD students of IPPT PAN, is engaged in joint activities aimed at obtaining research grants, organizing conferences and other scientific events, and also for various types of actions popularizing science. Also then, he/she acquires qualifications at PQF level 8 in the field of knowledge, in accordance with P8S_WG and P8S_WK, in terms of skills, in accordance with P8S_UW, P8S_UK, P8S_UO and P8S_UU, and in the field of social competences, in accordance with P8S_KK, P8S_KO and P8S_KR of the above-mentioned Regulation.To sum up, it should be stated that an active doctoral student during his/her studies at the DS of IPPT PAN has the full opportunity to obtain all qualifications at PQF level 8, in accordance with the requirements of currently applicable legal regulations. Also in accordance with these regulations, each PhD student must develop an Individual Research Plan (IRP) within the first 12 months of his or her studies. By completing the standardized form of this document in force at the DS of IPPT PAN, in the substantive part of IRP, the doctoral student must prepare a schedule for the preparation of the doctoral dissertation, specifying the actions planned for the following semesters and declaring the deadline for its submission, describe the planned research activities, specifying the topic of the doctoral thesis and the current state of knowledge in the represented topic and synthetically describe the research problem along with formulating the purpose of the work and describing the methodology of its implementation. Moreover, in IRP, a doctoral student must provide several basic literature items on the basis of which he/she intends to base his/her research activities and pre-plan his/her scientific activity in the form of, for example, participation in scientific conferences, applying for research grants or writing scientific articles. As one can see, all actions aimed at preparing IRP require the doctoral student to have or achieve most of the selected qualifications at PQF level 8 in terms of knowledge and skills already during the first year of studies. S.-est: 5.0

2. Method of verifying learning outcomes for qualifications at PRK level 8

The process of broadly understood learning at the Doctoral School of IPPT PAN (DS of IPPT PAN) takes place during the performance of a doctoral thesis and activity in scientific activities related to this process, as well as during the implementation of the didactic program in the form of attending lectures and classes, participating in various types of internships, trainings, workshops and others. This entire process enables us to obtain qualifications at PQF level 8, and its effectiveness is assessed by the results of the methods used to verify learning outcomes, the form of which depends on the specific activity of the PhD student.An important obligation of each PhD student is to submit an Individual Research Plan by the end of the first year of studies, which must be approved by the supervisor or supervisors or supervisor and auxiliary supervisor, the head of the DS of IPPT PAN, the relevant evaluation committee of the Scientific Council of IPPT PAN and, finally, by its chairman, as a result of voting on the validity of this plan during a meeting of this Council. Independently, the results of the scientific and didactic progress of each PhD student of the DS of IPPT PAN are assessed at the end of the second semester of studies during reviews of first-year PhD students organized by the Committee for the Education of Scientific Personnel of the Scientific Council of IPPT PAN, as a result of which each PhD student receives a written evaluation along with recommendations for further actions. Detailed regulations regarding the preparation of individual research plans and conducting reviews of the progress of first-year PhD students are formulated in §12 and §13 of the Regulations of the DS of IPPT PAN. In accordance with the provisions of applicable legal acts, each PhD student is subjected to the Mid-Term Assessment examination at the end of the second year of studies. The rules for conducting these examinations and appointing appropriate committees as well as all formal requirements for the PhD student and members of these committees are described in §14 - §17 of these Regulations. In accordance with the provision in §18 of the Regulations of the DS of IPPT PAN, the PhD student's progress in carrying out scientific research in subsequent years of study until the submission of the doctoral thesis is monitored by the doctoral commission appointed as an extended commission of the examination of his Mid-Term Assessment. The submission of a doctoral thesis by a PhD student formally ends his studies at the DS of IPPT PAN. Then, he or she is subjected to doctoral proceedings, in accordance with the relevant regulations of the Scientific Council of IPPT PAN. As part of this procedure, the qualifications of the PhD student are assessed in terms of the scientific level of the dissertation written, the possessed knowledge, and command of the English language.The procedures described above allow for the verification of the PhD student's learning outcomes in terms of knowledge, in accordance with the provisions of P8S_WG and P8S_WK, in terms of skills, in accordance with P8S_UW, and in terms of social competences, in accordance with P8S_KK of the Regulation of the Ministry of Science and Higher Education of November 14, 2018, item 2218 on the characteristics of second-level learning outcomes for qualifications at levels 6-8 of the Polish Qualifications Framework. At the same time, while completing the doctoral thesis, the PhD student's skills are verified in terms of transferring the acquired knowledge and experience in the form of seminar presentations, conference papers and writing scientific articles. By means of reviews, written opinions and oral or written recommendations, the PhD student's qualifications are also verified in terms of skills, in accordance with P8S_UW and P8S_WK, and in terms of social competences, in accordance with P8S_KK and P8S_KR of the above-mentioned. Regulations.The effects of the learning process during the implementation of the didactic program in the form of attending lectures and exercises, participation in various types of internships, trainings, workshops and others are also subject to verification in order to obtain qualifications at PQF level 8. The content of teaching classes, covering both "hard" and "soft" skills, offered by the DS of IPPT PAN is described in detail in the syllabuses of individual subjects, which are posted on the IPPT PAN website as part of the permanent teaching offer of this school. Each syllabus is prepared on a form unified at the DS of IPPT PAN and contains the initial requirements for a PhD student starting to study a given subject, the objectives of the subject, its program content, a short list of necessary literature, and criteria for assessing the degree of mastery of this subject. An important element of the content of each syllabus is the list and description of each qualification, which is referred to the relevant definitions of qualifications at level 8 of the PQF contained in the above-mentioned Regulations and in the modified Education Program of the DS of IPPT PAN approved by the Scientific Council of IPPT PAN. Moreover, at the end of each syllabus there is a list of the PhD student's hourly workload necessary to achieve the required learning outcomes and to determine the number of ECTS points.Pursuant to §1 Section 3 of this modified Education Program, before the beginning of each semester of studies at the DS of IPPT PAN, the PhD student, in consultation with his or her supervisor or supervisors, or supervisor and auxiliary supervisor, may choose from this offer the teaching classes to be attended, or in accordance with §1 Section 8 of this Program, choose other classes, i.e. lectures, exercises, laboratory classes and seminars, which may be conducted by teaching and research staff of other scientific units, also at the premises of other scientific institutions. Such classes may also be organized by IPPT PAN together with other research units.Since IPPT PAN is an institute of engineering and technical sciences, and mathematics is the basic tool for the research work of PhD students of the DS of IPPT PAN, in accordance with the provisions of §1 Sections 5-7 of the modified Education Program, regardless of the scientific discipline in which the doctoral thesis is being performed, a two-semester subject entitled "Basic mathematics in engineering science" in the form of lectures and auditorium exercises, and a one-semester course entitled "Fundamentals and application of tensor calculus in continuum mechanics", also in the form of lectures and auditorium exercises, are mandatory for all first-year students. Moreover, for first-year students working on doctoral theses in the disciplines of "Mechanical Engineering" and "Materials Engineering", a one-semester course is required: " Mechanics of continuum" in the form of lectures and auditorium exercises. However, PhD students of the DS of IPPT PAN carrying out doctoral theses in other scientific disciplines in which IPPT PAN is authorized to conduct research, i.e. "Technical Informatics and Telecommunications" and "Biomedical Engineering", in consultation with their supervisors, are obliged to attend selected didactic classes enabling them to deepen their basic knowledge in these disciplines. These classes can be conducted at IPPT PAN, as well as in other academic units.The method of verifying the skills acquired by a PhD student in a given subject is to check the level of his knowledge in the form of an exam, a pass or an assessment of his/her activity during classes. Pursuant to §6 Section 2 of the modified Education Program, credits for classes at the DS of IPPT PAN are assessed according to the following grade scale: unsatisfactory (2), satisfactory (3), quite good (3.5), good (4), above good (4.5), and very good (5). At the end of each academic year, the PhD student is obliged to present to the Head of the DS of IPPT PAN positive credits for the teaching

classes he/she participated in as part of the individual education program, in a form consistent with the requirements specified in the Act and Regulations of the Ministry of Science and Higher Education, in accordance with §6 Section 1 of this Education Program.Other forms of activity of a PhD student during his/her studies at the DS of IPPT PAN, which enable the acquisition of skills at PQF level 8, are also subject to verification. The fact of obtaining a research grant, either as its leader or as a member of a research team in cooperation with one's supervisor or supervisors, or with a supervisor and auxiliary supervisor and with other research workers and PhD students of IPPT PAN, is proof of obtaining appropriate qualifications. A similar type of verification is the organization of conferences and other scientific events, as well as various types of science popularization activities, as a result of cooperation with a given team of employees and PhD students not only from IPPT PAN, but also from other scientific units or research&development institutions. A way to verify the learning outcomes for qualifications at PQF level 8 when participating in various types of further education courses, summer schools, workshops and scientific conferences, research and teaching internships, professional internships and other such events may be to receive appropriate diplomas, certificates and confirmations issued by the organizers. The number of ECTS points obtained, if any, given in these documents additionally determines the participant's workload put into achieving the given learning outcomes. The above-mentioned forms of verification are proof of acquiring qualifications at PQF level 8 in terms of knowledge, in accordance with P8S_WG and P8S_WK, in terms of skills, in accordance with P8S_UW, P8S_UK, P8S_UO and P8S_UU, and in the field of social competences, in accordance with P8S_KK, P8S_KO and P8S_KR of the above-mentioned. Regulations.S-est: 5.0

3. Qualifications of academic teachers or research staff conducting education at the doctoral school

IPPT PAN has a scientific and research staff consisting of outstanding scientists, generally recognized around the world in their disciplines and research specialties. This is evidenced by their publication activity in highly ranked, reputable scientific journals, participation in prestigious international conferences and scientific symposia, and the number of conducted research projects. From among these researchers, teaching staff is recruited to conduct classes for PhD students at the Doctoral School of IPPT PAN (DS of IPPT PAN). These persons, in addition to outstanding scientific achievements, have extensive teaching experience thanks to many years of conducting lectures and exercises as part of the Doctoral Study of IPPT PAN from the period before the establishment of the DS of IPPT PAN, teaching students of universities outside IPPT PAN, as well as conducting numerous specialized courses, summer schools, etc., both in Poland and abroad. The most important lecturers conducting classes for PhD students of the DS of IPPT PAN include:1. Dr. Wasyl Kowalczuk, PhD, DSc, giving 1 compulsory and 3 elective lectures in mathematics. He represents the discipline of Mechanical Engineering, but his scientific activity focuses mainly on mathematical issues, which is reflected in his teaching activity for teaching PhD students at IPPT PAN since 2016, and from 2020 to the present: at the Academy of Technology and Art of Applied Sciences in Warsaw in the form of conducting lectures, exercises and design classes on the theory of elasticity, plasticity and prestressed structures, and in Polish-Japanese Academy of Information Technology in Warsaw in the form of conducting auditorium exercises in mathematics in English, and also from 2024 to the present at the Academy of Economics and Humanities in Warsaw in the form of conducting mathematics exercises in English. Publ. numb.: 36, cit. numb.: 224, H-index: 8.2. Prof. Katarzyna Kowalczyk-Gajewska, PhD, DSc, Civ. Eng., giving 2 obligatory lectures for many years, first at the Doctoral Study of IPPT PAN I and since 2019 at the DS of IPPT PAN. In addition, she gave guest lectures for PhD students at the Poznań University of Technology and for master's students at the Warsaw University of Technology. She represents the discipline of Mechanical Engineering and Materials Engineering. She specializes in material mechanics, in particular micro-mechanics, including crystal plasticity, and in analytical and numerical methods for finding the effective properties of heterogeneous materials. Over the last 6 years, she managed 2 NCN OPUS projects and, on the Polish side, 2 European projects enabling scientific exchange with the best universities in the USA. She supervised 3 PhD students at the same time. Publ. numb.: 55, cit. numb.: 811, H-index: 19.3. Prof. Stanisław Stupkiewicz, PhD, DSc, Mech. Eng., Corresponding Member of PAN, giving an elective lecture. He lectured twice at the CISM course in Udine, Italy. He represents the discipline of Mechanical Engineering, and is an outstanding specialist in contact mechanics and in modeling the evolution of microstructure in shape memory alloys in which martensitic phase transformation takes place, as well as in magnesium alloys subject to twinning. He is currently conducting 2 research projects. He is the supervisor of 3 PhD theses defended with distinction. Publ. numb.: 87, cit. numb.: 2514, H-index: 30.4. Prof. Wiera Oliferuk, PhD, DSc, Eng., conducting an elective lecture in the discipline of Materials Engineering and teaching classes at the Faculty of Mechanical Engineering of the Białystok University of Technology and at the Faculty of Materials Engineering of the Warsaw University of Technology. She is the author of several teaching scripts that have already been published and a script that is currently being prepared for the needs of the DS of IPPT PAN. The subject of her research are energy transformations during plastic deformation of polycrystals. She supervised a total of 4 PhD students. Publ. numb.: 31, cit. numb.: 598, H-index: 14.5. Prof. Elżbieta Pieczyska, PhD, DSc, Mech. Eng., giving an elective lecture in the discipline of Materials Engineering. She has delivered lectures at the invitation of several research centers in Belgium, Romania and Japan. An outstanding specialist in the theory of innovative materials, including shape memory ones. Her significant research achievement is the development of a methodology and experimental verification of thermomechanical couplings in the process of loading innovative materials - titanium alloys and shape memory polymers. He has promoted 3 doctors. Publ. numb.: 93, cit. numb.: 922, H-index: 17.6. Assoc. Prof. Łukasz Jankowski, PhD, DSc, Eng., giving elective lectures in the discipline of Technical Information Technology and Telecommunications for many years. An outstanding specialist in the field of computer science, mechanics and mechatronics, in particular the application of machine learning techniques in semi-active control, monitoring the technical condition of structures and identifying mechatronic systems. He has huge measurable achievements in this field, including: conducting 4 research projects and being a supervisor of 3 doctoral theses defended in Poland and co-supervisor of 2 theses defended in China. Publ. numb.: 125, cit. numb.: 970, H-index: 19.7. Prof. Paweł Sajkiewicz, PhD, DSc, Eng., giving an elective lecture in the discipline of Biomedical Engineering for PhD students of the DS of IPPT PAN and as part of the NCBiR–POWER "Och!Dok" project. In addition, he gave lectures, among others: in CISM-Udine (Italy), EMPA-St. Gallen (Switzerland) and SGGW Warsaw. An expert in the field of synthetic and natural polymers, their structure and properties, both from a fundamental and application perspective as biodegradable scaffolds for tissue regeneration. In recent years, he was the manager and contractor of 8 scientific projects of the National Science Center and NCBiR, and supervised 7 PhD students, of whom he promoted 4. Publ. numb.: 108, cit. numb.: 3571, H-index: 34.Due to the relatively small number of PhD students of the DS of IPPT PAN, as a doctoral school run by a research institute of the Polish Academy of Sciences and not a large public university, and the strong interdisciplinarity of the studies carried out related to the rights of IPPT PAN to conduct research and train staff in several scientific disciplines, there is usually a large dispersion of preferences when choosing lectures by PhD students before each subsequent semester. Due to this, the teaching potential of the existing teaching staff cannot always be fully used. Namely, due to organizational and financial constraints, the DS of IPPT PAN launches a given elective lecture provided that it is selected by at least 3 PhD students from IPPT PAN. This significantly limits the teaching possibilities available.Self - esteem: very good (5.0)

4. Quality of the recruitment process

Recruitment of candidates for doctoral students of the Doctoral School of IPPT PAN is based on the long-term, proven tradition of IPPT PAN originating from the existence of the Doctoral Study of IPPT PAN. Due to the lack of second-cycle education opportunities at the Polish Academy of Sciences research institutes, such as IPPT PAN, there are no conditions for learning about the qualifications of candidates for doctoral studies, as is usually the case at universities, e.g. during students' activities in scientific clubs. Therefore, we were and still are forced to check these qualifications particularly carefully during the entrance examination. Owing to this, over the years it has been possible to select highly motivated and competent young scientists, which results in high educational efficiency. Therefore, admission to the Doctoral School of IPPT PAN is also required to pass a written entrance examination in three subjects, i.e. mathematics, as IPPT PAN is an institute of technical sciences, a major subject corresponding to the scientific discipline in which the doctoral thesis is planned to be performed, and English. All information regarding recruitment rules, deadlines, required documents to be submitted and requirements for individual examination subjects are available on the website of IPPT PAN. Announcements of subsequent recruitments are posted on this website 90 days in advance. The entire recruitment process for the Doctoral School of IPPT PAN is regulated by the provisions of the document entitled: "Recruitment rules for the Doctoral School of IPPT PAN ", which has been formally in force since the beginning of the school's existence. According to these rules:Every candidate who has completed courses of higher education and holds an MSc, an MSc Eng. or another equivalent degree or a candidate referred to in art. 186 section 2 of the Act "Law on Higher Education and Science" (pursuant to art. 200 section 1 of this Act) may apply for admission to the Doctoral School of IPPT PAN.Enrolment at the Doctoral School of IPPT PAN is open to Polish citizens, citizens of other European Union Member States and the EEA states and to the citizens of other countries, according to the rules set out in other regulations.Admission to the Doctoral School of IPPT PAN is granted to the candidates who successfully completed the recruitment process, which involves a competition. The competition is designed to check whether the candidate demonstrates the required competence and interest in academic work, is well prepared for the study of the chosen discipline and has a command of the foreign language necessary for the chosen speciality. Recruitment of the candidates for the Doctoral School of IPPT PAN is carried out by the Recruitment Committee appointed by the Director of IPPT PAN.Competition results are open and public. IPPT PAN ensures transparency of results by publishing the name of the candidate and information: ‘admitted’ or ‘not admitted’ on the IPPT PAN website and on the notice board in the IPPT PAN.Detailed information about recruitment requirements and the date of recruitment is openly published, especially on the website of IPPT PAN.Candidates applying for admission to the Doctoral School of IPPT PAN should submit appropriate documents, the list of which can be found in the "Recruitment rules for the Doctoral School of IPPT PAN.In order to be admitted to the Doctoral School of IPPT PAN, candidates must pass the following exams:a) written exam in mathematics,b) written exam in the main subject, corresponding to the discipline in which the candidate plans to carry out research,c) written exam in English (which involves accurate and exact translation of a popular science text from Polish to English).In justified cases and with approval from the Recruitment Committee and the Director of the Doctoral School of IPPT PAN, the candidate may additionally take an oral exam in the form of an interview, which is supposed to check candidate’s other qualifications necessary to realize the subject of the PhD programme. This form of recruitment may be offered to the candidates who will run scientific and research projects.In justified cases and with approval from the Recruitment Committee and the Head of the Doctoral School of IPPT PAN, exams mentioned in sections a), b) and c) may be held using multimedia on-line techniques. This applies in particular to disabled candidates or to those who are abroad on the day of exam.Candidates have access to sample exam tasks used at the Doctoral School of IPPT PAN in previous years.Candidates are admitted to the Doctoral School of IPPT PAN by virtue of a decision taken by the Director of the Doctoral School of IPPT PAN on the basis of the documentation submitted by the Recruitment Committee.An important advantage of written exams in mathematics and major subjects conducted in this way is the measurability of their results, which is extremely helpful in creating ranking lists necessary to make decisions about whether or not to admit a candidate to studies. Namely, the way of solving mathematical tasks and developing the topics of the major exam is scored. In order to objectify the results of exams in various scientific disciplines, a common maximum number of points to be obtained is adopted for all. Thanks to this, the results of major subject examinations taken in various scientific disciplines become mutually comparable, as if they were measured in the same units.In order to avoid difficulties when appointing a supervisor or supervisors or a supervisor and an auxiliary supervisor to doctoral students, each candidate for the Doctoral School of IPPT PAN must, before the entrance examination, declare an independent researcher who will confirm his/her will to supervise his/her research leading to the writing of a doctoral dissertation. Such confirmation is an expression of a positive assessment of the candidate's predispositions to perform doctoral work. In the conditions of a research institute of the Polish Academy of Sciences with a relatively small number of independent research workers who, in accordance with the regulations, can be supervisors of doctoral theses, it quite often happens that a given candidate to the Doctoral School of IPPT PAN designates a person who is also an examiner for one of the required examination subjects. Then, in order to ensure full objectivity when assessing the result, his/her examination work in this subject is checked by another, appropriately competent specialist from IPPT PAN. Candidates with disabilities can take the entrance exam in a stationary manner, using the infrastructure of the building of IPPT PAN and the care of examiners and other employees of IPPT PAN. The second option is to take the exam remotely. An important element of conducting a written entrance examination is to ensure comparable conditions for passing it for candidates taking the exam in the stationary mode and remotely, i.e. online. Candidates taking the exam online take the exam in parallel, i.e. at the same time and within the same time frame, i.e. 90 minutes for mathematics and a major subject and 60 minutes for English. They must be on camera at all times so that examiners present in the examination room can observe their behaviour, similarly to candidates taking the exam in person. In addition, they are obliged to set their cameras so as to minimize the possibility of unacceptable behaviour, i.e. cheating, and they are obliged to immediately electronically send the results of their works to the examiners after the expiry of the statutory passing time. If a foreign candidate is not exempt from the obligation to take an English language exam, e.g. if he/she does not have sufficiently convincing certificates, or if English is not an official language in his/her country, he/she translates the required text into his/her native language, and the result is then assessed by an appropriate specialist in this field.The results

of the entrance examinations to the Doctoral School of IPPT PAN are analyzed by the Recruitment Committee, whose members are each time appointed by the Director of IPPT PAN. The chairman of this committee is the Deputy Director of IPPT PAN for Scientific Affairs, and its members also include: the Head of the Doctoral School of IPPT PAN, examiners for individual subjects, generally coming from the group of independent research workers of IPPT PAN, and representatives of the Doctoral Student Government of IPPT PAN as observers. It should be noted that the composition of the Recruitment Committee cannot be permanent, because examiners for specialized subjects are selected on the basis of candidates' declarations regarding the topics of doctoral theses to be performed within the corresponding scientific disciplines. The representatives of the Doctoral Students' Self-Government of IPPT PAN may also change in each subsequent academic year. Based on the minutes of the Recruitment Committee meeting containing suggestions regarding the acceptance or non-admission of individual candidates, the Director of IPPT PAN makes final decisions on these issues. These decisions in the form of documents are delivered to candidates in accordance with the provisions of the Code of Administrative Procedure, and a summary of these decisions is made public on the IPPT PAN website and on the notice board at the IPPT PAN headquarters. So far, the efficiency of recruitment to the Doctoral School of IPPT PAN has been on average approximately 80-85%, where the necessary condition for accepting a candidate is a positive result in the entrance examination in all of the abovementioned subjects, and a sufficient condition is the possibility of financing the candidate's doctoral scholarship, both from the budget of IPPT PAN and from research projects, where the candidate's ranking result in the form of points number gained in mathematics and main subject is the factor determining admission.S-e:5.0

5. Quality of scientific or artistic supervision and support for conducting scientific activities

Direct research care of a PhD student of the Doctoral School of IPPT PAN (DS of IPPT PAN) is provided by his/her supervisor or supervisors or supervisor and auxiliary supervisor. This person or persons come almost exclusively from the group of independent researchers of IPPT PAN. The quality of this supervision is primarily related to their scientific level, which is generally exceptionally high. Independent research workers of IPPT PAN are generally recognized worldwide as researchers in their fields owing to their high publishing activity in renowned scientific journals, presentations given at prestigious international conferences and symposia, and involvement in research projects, including those of international scope, as well as by conducting numerous lectures and training sessions during all kinds of scientific workshops and courses. The measurable effect of these activities is the high values of bibliometric parameters that they achieve. The enormous commitment of researchers of IPPT PAN in conducting research in their specialties at the highest world level guarantees that PhD students studying with them will be able to write high-quality doctoral dissertations. Thanks to this, the DS of IPPT PAN is free from the risk of improper management of research by novice researchers. According to the existing regulations concerning the rules of recruitment to the DS of IPPT PAN, a preliminary agreement must be concluded between each candidate and a given independent researcher of IPPT PAN regarding the will and subject of jointly conducted research leading to writing a doctoral dissertation. This allows future supervisors to assess the candidates' abilities for scientific and research work and greatly facilitates the procedures of formally assigning supervisors to these candidates, when they become first-year PhD students.Due to the relatively small number of PhD students of the DS of IPPT PAN in the context of a research institute of the Polish Academy of Sciences, there are convenient conditions for their free access to their supervisors. Doctoral students are usually constantly present during the working hours of IPPT PAN, almost like full-time employees, usually in permanent contact with their supervisors. There is therefore no need to set formal consultation hours for PhD students or to set time limits for the duration of these meetings. Owing to the long-standing tradition of such a style of cooperation between PhD students and their supervisors at IPPT PAN, external doctoral students of the DS of IPPT PAN employed outside the institute and implementing the Program of the Ministry of Higher Education and Science called "Implementation doctorate" can contact each other in a similarly comfortable way.The Regulations of the DS of IPPT PAN in §9, sections 1 and 2 specify the principles for appointing a supervisor or supervisors or a supervisor and an auxiliary supervisor for PhD students in their first year of studies. In turn, §10 describes their obligations towards their doctoral students. In the event of a conflict between the supervisor or supervisors and the PhD student, it is possible to make an appropriate change of the scientific mentor. The procedure related to such a change is specified in the provisions of §11, sections 1-4 of the Regulations of the DS of IPPT PAN. When a conflict between a PhD student and his/her supervisor or supervisors takes on a deeper, often more personal character, the case is taken over by the peer court of IPPT PAN, headed by the employee rights advocate (the so-called ombudsman) who also deals with doctoral students.An extremely important organizational unit in IPPT PAN dealing with doctoral student affairs is the Committee for the Education of Academic Staff of the Scientific Council of IPPT PAN (KK RN IPPT PAN). Its task is to permanently monitor the scientific and didactic progress of PhD students in the implementation of activities leading to the completion of a doctoral dissertation. At the turn of June and July of each academic year, this committee organizes reviews of the achievements of first-year doctoral students of the DS of IPPT PAN. During such a review session, each PhD student, in the presence of his/her supervisor or supervisors, is required to briefly present the results of his/her research and teaching activities in the form of a 15-minute presentation to members of the Education Committee selected based on their competences in the discipline in which the doctoral thesis is planned to be completed. In addition, the Individual Research Plan (IRP) being prepared is also assessed and must be finally submitted by the end of September. As a result of such a review, an assessment of the presented achievements is issued and suggestions are formulated regarding further actions of the doctoral student and his/her supervisor or supervisors. In addition, the KK RN IPPT PAN supervises the acceptance and final submission of IRPs and the procedure for approving these plans during the meetings of the Scientific Council of IPPT PAN, as well as conducting mid-term assessment exams for second-year PhD students, also together with the procedure for approving the results of these exams during the meetings of the Scientific Council of IPPT PAN.The scientific activity of IPPT PAN also consists in organizing and regularly conducting seminars, in which PhD students of the DS of IPPT PAN also participate passively and actively. These are thematic seminars, e.g. on mechanics, materials engineering, or applications of ultrasound in medicine, as well as departmental and laboratory seminars. The speakers at these meetings are often outstanding scientists from Poland and abroad. Due to the relatively significant number of foreign PhD students, presentations and discussions during all seminars at IPPT PAN are conducted in English. Within the framework of existing international research cooperation and scientific contacts held by employees of IPPT PAN, outstanding foreign scientists have the opportunity to consult the results of doctoral theses, share their experiences with PhD students, and also act as co-supervisors. The type of such support for the research work of doctoral students of the DS of IPPT PAN depends on the nature of the cooperation of the supervisor or supervisors with a given foreign research center.The technical infrastructure of the building of IPPT PAN, i.e. ramps, wide corridors, elevators, kitchen facilities, and toilets allow for the functioning of PhD students with disabilities. To the extent possible resulting from the applicable regulations, the research staff of IPPT PAN and the DS of IPPT PAN, including supervisors, are ready to demonstrate additional care for PhD students who are young mothers. This applies to the issue of paying doctoral scholarships, extending the status of a PhD student of the DS of IPPT PAN, and the most flexible approach to enforcing the research results and teaching effects they obtain.S-e:5.0

6. Integrity of the mid-term evaluation process

The mid-term evaluation exam in doctoral schools, in accordance with its general intention specified in the applicable top-down regulations, serves to verify the level of advancement of research and teaching progress of PhD students after the second year of studies, which promises effective completion of a doctoral thesis. The preparatory procedure and the course of the mid-term evaluation exam in the Doctoral School of IPPT PAN (DS of IPPT PAN) are described in § 14-17 of the Regulations of the DS of IPPT PAN. In accordance with these provisions:The Scientific Council of IPPT PAN individually appoints the Mid-Term Evaluation Committee (MTEC) and the Doctoral Committee (DC) for each PhD student, taking into account the provisions of the Act "Law on Higher Education and Science" of July 20, 2018. These committees are appointed before the end of the half of the education period at the DS of IPPT PAN. Thanks to this, the PhD student is notified in advance of the obligation to prepare for this exam.The MTEC is composed of three persons, including at least one person employed outside IPPT PAN, and at the same time not employed by IPPT PAN. All persons in the MTEC hold the degree of habilitated doctor or the title of professor. The DC is composed of at least three members, including at least one member of the Scientific Council of IPPT PAN. All members of the MTEC are also members of the DC. The Standing Committee of the Scientific Council of IPPT PAN in the scope of the discipline in which the doctoral dissertation is being prepared proposes to the Scientific Council of IPPT PAN the composition of the MTEC and the DC. In the event that the doctoral dissertation is prepared in a field without a specified discipline, the composition of both Committees is proposed by the Committee for the Education of Academic Staff of the Scientific Council of IPPT PAN. Persons proposed as members of both Committees must express their consent to perform this function before the proposal is presented to the Scientific Council of IPPT PAN. In this way, the composition and competences of the aforementioned committees are determined.In the case of a doctoral dissertation that includes scientific issues from more than one discipline, the supervisor, in agreement with the Committee for the Education of Academic Staff of the Scientific Council of IPPT PAN and other supervisors or an auxiliary supervisor, submits a written declaration in which they specify the first and second or first, second and third discipline appropriate to the substantive content of the dissertation. In the case specified above, the MTEC includes persons conducting scientific research in the disciplines listed in this declaration.The mid-term evaluation exam at the DS of IPPT PAN is conducted as follows:The date of this exam for each second-year PhD student is set between the beginning of the twenty-first and the end of the twenty-fourth month of education at the DS of IPPT PAN, i.e. between June 1 and September 30 of a given academic year. This relatively long time period is to provide an opportunity to make additions in the event of reservations regarding the required progress reported in the verdict of the MTEC. This Committee is obliged to conduct this exam strictly in accordance with the provisions of the aforementioned legal Act.The preparatory procedure and the mid-term evaluation course at the DS of IPPT PAN are as follows: A PhD student submits to the Scientific Council of IPPT PAN (in paper and electronic form) their CV, current individual research plan (also containing the names of the supervisor or supervisors or an auxiliary supervisor and the discipline in which they plan to obtain a doctoral degree), the supervisor's opinion, a list of scientific, didactic and organizational achievements (no more than one A4 page), including a list of the most important scientific publications, indicating which of the scientific achievements will be part of the doctoral dissertation. The Secretariat of the Scientific Council of IPPT PAN forwards these documents to all members of the Standing Committee of the Scientific Council of IPPT PAN from a given discipline.As part of the exam itself, the PhD student delivers a 30-45 minute seminar, during which he/she presents the scientific results obtained so far, which will constitute part of his/her doctoral dissertation. This seminar takes place in the presence of members of the DC, and the participation of all members of the MTEC is obligatory. The presence of a supervisor or supervisors or a supervisor and an auxiliary supervisor is recommended. This seminar is open to the public.In the next step, after conducting a routine, seminar discussion, the DC holds a conversation regarding the topic of the dissertation and the implemented individual research plan with the PhD student in a closed mode, i.e. without the presence of third parties. Then, the MTEC, at a closed meeting among itself, evaluates the concept of the doctoral dissertation, progress in the implementation of the individual research plan and the scientific value of the achieved results. In justified cases, this Committee may formulate recommendations and conclusions for the PhD student and/or supervisor regarding the supplementation or improvement of the results submitted for evaluation. The supplemented and corrected results should then be presented to this Committee within 3 months of the issuance of the recommendations by the MTEC. The supplemented and corrected results are subject to evaluation by the MTEC after the PhD student has given another similar 30-45 minute open seminar, the PhD student has been heard in closed session by this Committee and during a repeated meeting of this Committee itself.During the first (if the Committee's assessment is positive) or second (if there is a need to supplement the progress of the PhD student) closed abovementioned meeting of this Committee, the MTEC decides in an open vote, whether the result of the mid-term assessment is negative or positive, providing a substantive justification. Then, this Committee presents the final result of the mid-term assessment with its justification to the Scientific Council of IPPT PAN and the Head of the DS of IPPT PAN.An appeal against the decision of the MTEC may be lodged in the event of a negative result of the mid-term evaluation exam, resulting in, in accordance with the top-down regulations, in the removal of the PhD student from the list of PhD students of the DS of IPPT PAN by the Director of the IPPT PAN by way of an administrative decision. In such a case, the appeal procedure against this decision is regulated by the provisions of § 30, section 4 of the Regulations of the DS of IPPT PAN and separate regulations. It should be noted that since the beginning of the functioning of the DS of IPPT PAN, all of its PhD students have passed the mid-term evaluation exam and there has been no need to file appeals. Self-esteem: very good (5.0)

7. Internationalization

IPPT PAN and the Doctoral School of IPPT PAN are open to all beneficial forms of international cooperation. This is evidenced by the high activity of researchers of IPPT PAN in the form of presentations at international conferences, congresses, summer schools and workshops, as well as participation in international research projects and various types of foreign research internships. Owing to this, they conduct various types of scientific cooperation and exchange of experiences with many well-known academic centers and research and development units in most of the important countries on the scientific map of the world. The list of these countries and centers would be so long that it would be impossible to include it in this limited volume of the study. A certain measurable form of international activity of researchers of IPPT PAN is the number of conducted research projects in which foreign scientific institutions are partners, and grants financed from foreign funds in which IPPT PAN participates. In the years 2019-2022, IPPT PAN conducted 11 research projects of an international nature, and in the years 2022-24 9. Of these, 11 were financed from domestic funds, where foreign units were co-performers, and 9 were financed from foreign funds, including 5 from European Union funds. In all of the above-mentioned projects, the performers were also doctoral students of the Doctoral School of IPPT PAN.As a result of the scientific and research contacts established and strengthened in this way, IPPT PAN currently employs 2 independent research workers as professors of the institute, 16 assistant professors, 1 in a research and technical position and 9 in an engineering and technical position, who are foreigners. In turn, in the Doctoral School of IPPT PAN in 2019-2024 15 PhD students from abroad studied out of a total of 35 doctoral students, and currently out of all 27 doctoral students of this school, 12 are foreigners. Two foreign doctors employed at IPPT PAN conduct classes for PhD students at the Doctoral School of IPPT PAN. Due to the relatively large number of foreign employees at IPPT PAN, including lecturers, and the presence of foreign PhD students at lectures and exercises, classes are conducted almost exclusively in English. Since the participants of most scientific seminars are foreign employees and PhD students, the language of instruction at these meetings is also English. Conducting classes and seminars at IPPT PAN in English is authorized by the relevant provisions of § 1, section 2, item 9 and § 7 of the modified Education Program of the Doctoral School of IPPT PAN. In order to facilitate communication for all foreigners working and studying at IPPT PAN, all announcements and e-mail correspondence concerning not only scientific matters, but also containing administrative information, are sent in English.Depending on the existing contacts of researchers of IPPT PAN with foreign research centres and financial possibilities, PhD students of the Doctoral School of IPPT PAN complete research internships in these institutions. Thanks to this, outstanding researchers from these centres can become co-supervisors of doctoral theses prepared by these doctoral students. An example is the internship of a PhD student from the Islamic Republic of Iran in Spain, which resulted in the co-supervisor of her dissertation by the renowned Assoc. Prof. Andres Díaz Lantada from the Mechanical Engineering Department of Universidad Politécnica de Madrid. Another example of the internationalization of the activities of the Doctoral School of IPPT PAN is the completed doctoral dissertation of a PhD student from the Islamic Republic of Iran under the supervision of Assoc. Prof. Filippo Pierini, a citizen of Italy, who is employed at IPPT PAN.Foreign PhD students coming to Poland from their countries after reporting to IPPT PAN to begin their PhD studies at the Doctoral School of IPPT PAN benefit from funds for settling in, just like PhD students from Poland who, due to their arrival from a place of residence sufficiently distant from Warsaw, are entitled to such financial support. Regardless, foreign PhD students can actively participate in the Doctoral Students' Government of IPPT PAN. This is evidenced by the current chairmanship of this organization by a citizen of the Republic of India.Owing to the international activity described above and the long-standing scientific reputation, IPPT PAN is a research unit recognized worldwide. Therefore, foreign candidates for the Doctoral School of IPPT PAN declare their willingness to cooperate with independent research workers and their willingness to take the entrance exam. They do this largely by e-mail, when they do not know these employees personally, or directly during all kinds of scientific meetings with them in Poland and abroad. The simultaneous website of IPPT PAN and the Doctoral School of IPPT PAN, run in English, is an additional, important source of information in this field. It should be noted that the graduates promoted in IPPT PAN, i.e. previously of the Doctoral Studies of IPPT PAN and currently of the Doctoral School of IPPT PAN, are its worthy calling card, thanks to which this school and the Institute gain positive publicity in the world and greater recognition.Any form of internationalization of doctoral studies at the Doctoral School of IPPT PAN has a positive impact on the acquisition of skills at the level of 8 PQF, both for Polish and foreign doctoral students. Thanks to this, most of the criteria required in this field can be met. The learning outcomes worth emphasizing here are:1. in terms of knowledge:P8S_WG – to the extent enabling the revision of existing paradigms – learning about the world’s achievements, including theoretical foundations and general issues and selected specific issues – appropriate for the represented scientific discipline, including the latest scientific achievements in the area of research conducted;P8S_WK – understanding the fundamental dilemmas of contemporary civilization.2. in the scope of communication:P8S_UK – communication on specialist topics, relevant to the represented scientific discipline, to a degree enabling active participation in the national and international scientific community, including within international consortia of research universities;P8S_UK – use of a foreign language (English) at level B2 of the Common European Framework of Reference for Languages to a degree enabling participation in the international scientific and professional community;P8S_UO – planning and implementing – in a methodologically correct manner – individual and team research or creative projects, also in an international environment.3. in the scope of social competences:P8S_KK – critically assessing one's own contribution to the development of the represented scientific discipline.Self-esteem: above good (4.5)

8. Effectiveness of doctoral education

Percentage of individuals who obtained a doctoral degree	Doctoral students who applied for initiation of proceedings for the award of a doctoral degree	Doctoral students who were awarded a doctoral degree	Doctoral students who were denied the award of a doctoral degree
in the number of doctoral students who completed their education at the doctoral school during the evaluation period	100 %	33 %	0 %
in the total number of doctoral students who completed their education at the doctoral school	100 %	33 %	0 %

As evidenced by many years of observations made during the operation of the Doctoral Study of IPPT PAN and from analogous observations of the efficiency of many Polish technical universities, the completion of doctoral theses in the field of engineering and technical sciences takes on average no less than 5-6 years. This is due to the high workload of these dissertations, especially when the theoretical research results obtained within them must be subjected to experimental verification. To date, one third (33%) of doctoral students of the Doctoral School of IPPT PAN, i.e. 3 out of 9, have managed to fully finalize their doctoral theses, and the rest, whose doctoral student status has been extended, are finishing their dissertations and are close to starting doctoral proceedings for them. In order to ensure the high quality of the results of their research work leading to the award of a doctoral degree, their progress and results are monitored until the very end of the doctoral procedure by the doctoral commissions assigned to them, which in the last phase of the procedure appoint appropriately competent reviewers, so that the final doctoral dissertations are properly and objectively assessed. Due to this situation and the results of the above-mentioned statistical observations, we anticipate achieving the real effectiveness of education for doctoral students of the Doctoral School of IPPT PAN at a level of not less than 80-90%, i.e. the values achieved by the Doctoral Study of IPPT PAN.Many particularly talented and motivated PhD students of IPPT PAN are employed at the Institute after receiving their doctorate in technical sciences. Then, they usually continue their scientific path very successfully, achieving further degrees and titles, remaining permanently in the academic society. Due to staff shortages for these tasks, neither IPPT PAN nor the Doctoral School of IPPT PAN monitors the professional careers of graduates who are not employed at IPPT PAN.S-e: 4.0

1. materials engineering

Achievement Description

MATERIALS ENGINEERINGDiss. title: Dependence of properties of carbon nanoparticles synthesized and modified by laser ablation in liquid on process parameters.by Agata Kaczmarek Carbon nanostructures, due to their extraordinary optical, electrical and mechanical properties, have enjoyed unwavering interest among researchers in recent years. Due to their good biocompatibility, these materials can replace commonly used organic dyes and semiconductor quantum dots in probes, fluorescent sensors or biomedical imaging. An important representative of carbon nanostructures are nanoparticles. For further research, as well as potential applications of carbon nanoparticles, it is important to develop efficient methods for obtaining nanoparticles with well-defined properties. In addition, the ability to control these properties by selecting the parameters of the synthesis process is very important for applications. One of the methods of obtaining carbon nanoparticles is the method using laser beam ablation of a graphite target immersed in a liquid. Laser ablation in a liquid is an alternative to chemical methods of obtaining carbon nanoparticles. In this method, the material, for example in the form of a carbon (graphite) target, is immersed in a liquid and exposed to a laser beam. Nanosecond pulsed lasers are most commonly used. In this work, an Nd:YAG laser with a pulse duration of about 10 nanoseconds and a pulse energy of 1 J was used. As a result of interaction with the laser beam, the surface of the target heats up to temperatures of several thousand Kelvins, which causes the material to evaporate. The resulting vapors of the target material interact with the surrounding liquid and rapidly condense, which leads to the formation of nanostructures. The properties of the resulting nanostructures, such as size, shape and crystal structure, very strongly depend on the parameters of the laser beam, the structure of the target material and the properties of the liquid in which the process takes place.Although there have been many works devoted to establishing the interrelationships between the synthesis conditions (such as laser beam parameters or reagent selection) and the structural properties (chemical composition, microstructure, size) and optical properties of carbon nanoparticles, the conclusions from the published research results have not been unambiguous. The analysis of published works has shown that even in the case of experiments conducted under similar conditions, there is no consensus among researchers on the dependence of the properties of carbon nanoparticles on the parameters of the laser ablation process. As a result, the control over the properties of the obtained nanoparticles is difficult, and therefore

their potential application.The above-mentioned ambiguities regarding the influence of synthesis parameters on the properties of carbon nanoparticles constitute an important research problem, the resolution of which is of great importance for various applications of such a promising material as carbon nanoparticles.The motivation for the research presented in the described doctoral dissertation was the search for connections between the parameters of the laser ablation process and the properties of carbon nanoparticles, as well as the described ambiguities regarding the influence of laser ablation parameters on the properties of carbon nanoparticles obtained by this method. This issue is a fundamental research problem, the solution of which is of great importance for various areas of carbon nanoparticle applications.Moreover, the mechanisms of carbon nanoparticle photoluminescence are still unclear. Various hypotheses are presented in the literature on this subject, which are often mutually contradictory. In most cases, the synthesis of nanoparticles occurs through complex processes involving many chemical substances. It is also possible to interact with the substances used by a laser beam. As a result, in addition to nanoparticles, reaction product molecules are created, which can also show photoluminescence (fluorophores), and whose subsequent separation is very difficult.The main goal of the dissertation was to search for connections between laser beam parameters, ablation phenomena, and nanoparticle formation processes. In addition, the aim of the work performed was to analyze the effect of the reagent used (type, amount, and/or concentration) on the optical properties of carbon nanoparticles and to determine the method of optimal modification of their surface. The aim of the research was also to determine the mechanism of light emission (NIR, VIS, UV) by carbon nanoparticles.The issues of producing carbon nanoparticles and their properties have been the subject of intensive research for many years in many centers around the world. Therefore, it might seem that there is not much new to discover in this field, especially with relatively modest resources compared to the leading laboratories in the world. However, the strategy adopted by the PhD student, consisting in the gradual reduction of the number of components and physical and chemical processes involved in the production of carbon nanoparticles, allowed her to obtain valuable results.The commonly accepted ablation method in strong reagents used in the first phase of the PhD student's research allows for obtaining luminous carbon nanostructures, but at the same time the presence of additional chemical substances makes it extremely difficult to identify and characterize these structures. Therefore, in the next stages of the work, the author departed from the popular methodology, implementing her own, which involves the gradual elimination or separation of factors that obscure the image.For example, carrying out ablation in pure water allowed us to focus research on the physical processes related to the ablation itself, to investigate these processes more thoroughly, and to determine the optimal range of parameters at which the produced nanoparticles have a spherical shape and minimal size.As shown, the ablation process parameters should be selected in such a way that the temperature of the resulting plasma is as low as possible, at its highest possible pressure. To ensure low temperature during ablation, the process should take place at low values of laser pulse fluence, i.e. pulse energy per unit of target surface area.The optimum fluence value for graphite was determined to be approximately 4 J/cm2. At this fluence, the ablation efficiency is maximal, and the ablation is thermal, generating pure carbon vapors. In addition, undesirable phenomena such as crushing of the graphite target due to the recoil pressure or ejection of the melted material from the target in the form of droplets and solid fragments are avoided.Using the estimated parameters, the ablation of the graphite target in water was carried out. The obtained suspension of carbon nanoparticles in water is characterized by a high degree of homogeneity, and the obtained particles are spherical and have sizes in the range of 3-5 nm.Similarly, adding the luminescence activating reagent only in the next stage to the previously prepared nanoparticle suspension allowed for a more detailed study of the activation process itself. Thanks to the procedure for modifying the properties of carbon nanoparticles proposed in the dissertation, the observed change in the optical properties of the particle suspension after adding the reagent can be unequivocally attributed exclusively to the interaction of nanoparticles with the functional groups of the used reagent.The analysis of the research results showed that the mechanism of nanoparticle emission is not related to the type of the reagent used, and consequently – to the type of attached functional groups. Using the example of the properties of mixtures of carbon nanoparticle suspensions in water and polyethyleneimine (PEI), it was shown that in the presence of the polymer, particle aggregation occurs and the emission intensity of the system increases. Thus, the concept of the emission mechanism associated with particle aggregation was confirmed. It was shown that the particle aggregation process in the presence of the polymer is associated with the electrostatic interaction between negatively charged carbon nanoparticles and PEI cations.The adsorption kinetics models adopted by the author showed that the change in emission over time is controlled by the diffusion process, i.e., the transport of the reagent to the nanoparticle surface takes place by diffusion. Moreover, it was also found that the optical properties of the mixture are determined by the first (fast) stage of the diffusion process, in which the driving force of adsorption is the electrostatic attraction between oppositely charged particles/molecules. In her work, the author demonstrated that the laser ablation method in liquid allows the production of well-defined carbon nanoparticles with dimensions of several nanometers and determined the ablation conditions that lead to this. She demonstrated that the light-activated luminescence of carbon nanoparticles is associated with the presence of other chemical substances, the so-called activator. She then identified, tested and described one of the possible processes of such photoluminescence. She also demonstrated that, unlike the commonly accepted procedure, when operating according to the methodology described in the dissertation, a minimal addition of a reagent, of the order of 0.1%, is sufficient to activate the photoluminescence of a suspension of nanoparticles.This type of research has not been described in the known literature before. The results of the research conducted as part of the doctoral thesis have been described in five publications in peer-reviewed journals of global reach indexed in the Scopus database. Despite the short time since their publication, these publications have already been cited more than 100 times in total.

2. mechanical engineering

Achievement Description

SCIENTIFIC DISCIPLINE: MECHANICAL ENGINEERING

Dissertation tittle: Micromechanical modelling of voided FCC and HCP polycrystals in inelastic regime
Dissertation author: Saketh Virupakshi, MSc., Eng. Supervisor: Prof. Katarzyna Kowalczyk-Gajewska, PhD., DSc., Civ. Eng.
Auxiliary supervisor: Dr. Karol Frydrych
High specific strength metals and alloys with face centered cubic (FCC) and hexagonal close packed (HCP) lattice symmetry are gaining significant interest in the transport and aerospace sectors because of their excellent strength-to-weight ratios and improved durability at high temperatures. However, the widespread application of such materials is sometimes impeded by their low ductility and poor fracture toughness. These constraints stem from the distinct crystallographic characteristics, which for HCP crystals limit the availability of easy slip systems and leads to activity of twinning. Moreover, for some alloys with FCC symmetry, despite their high lattice symmetry, the initiation of twinning results in low ductility and fracture toughness as well. The scientific aim of this thesis is to comprehend and elucidate, through numerical analyses and micromechanical modelling, the relationship between crystal anisotropy and the processes of void growth and coalescence that result in ductile damage in polycrystalline metals and alloys characterized by FCC and HCP symmetry, especially when they deform by slip and twinning. Nucleation, growth and coalescence of intra/intergranular micro-voids is a usual scenario by which polycrystalline ductile metallic materials fail. Most often micro-voids are nucleated as a result of decohesion or fracture process of second phase precipitates. Growth of those micro-defects takes place due to diffuse plastic deformation up to the onset of coalescence when strain localizes in the ligament connecting closely spaced voids. After that moment the voids continue expansion, mostly towards each other up to final ligament failure or full impingement. A better understanding of the void growth failure mechanism in highly anisotropic high specific strength materials will facilitate the reduction of the aforementioned limitations of their use in industrial application. Literature review indicated that the failure mechanism linked to void growth under conditions of locally constrained plastic deformation within a crystallite and the markedly heterogeneous stress field in a polycrystalline volume element is not yet fully understood and incorporated into validated constitutive models. Micromechanics, describing the connection of the macroscopic response of heterogeneous materials with the local properties and microstructure geometry through properly selected micro-macro transition schemes, is considered a well-suited tool to address the problem and fill this gap. In analogy to the seminal results by Gurson, Tvergaard, and Needleman (the so-called GTN model of ductile damage), the applied approach yields macroscopic elasto-(visco)plastic models for porous crystals and polycrystals of specified lattice symmetry. These models can then be utilized as material models in large-scale finite element (FE) calculations.In the thesis numerical full-field calculations are employed to investigate porous FCC and HCP crystal structures, using both 2D plane strain unit cells with cylindrical voids and 3D unit cells with spherical voids. This method allows for an in-depth analysis of how boundary conditions, crystal orientations, and initial void volume fractions impact void evolution and stress or strain heterogeneity in these materials. To achieve this goal, a rate-dependent crystal plasticity constitutive theory is considered. The theory incorporates slip and twinning mechanisms, accounting for their mutual interactions in terms of hardening laws and the lattice reorientation effects due to twinning.Furthermore, to predict the macroscopic behavior of porous polycrystals, a micromechanical mean-field model is formulated. At the level of porous single crystal, an additive Mori-Tanaka scheme is employed to capture the elasto-viscoplastic response. In the next step, an additive self-consistent scheme is implemented to estimate the overall behavior of the porous polycrystal. The numerical implementation of this model at both stages is detailed, offering a comprehensive framework for its application. Predictions from the mean-field model are validated and analyzed against full-field numerical computations. Moreover, a novel GTN-type yield criterion for porous crystals is formulated using a micromechanical approach, with model tuning parameters calibrated via performed full-field unit cell calculations. Comparisons are drawn between the newly proposed model and existing models in the literature. The findings from this research hold significant potential for predicting the performance of porous polycrystalline materials across various loading scenarios.The following key novel contributions of the thesis to the discipline of mechanical engineering can be indicated:· The effect of crystallographic orientation and different boundary conditions on void growth and coalescence, along with related microstructural evolution due to heterogeneous lattice rotation, has been thoroughly examined employing full-field large strain CPFEM (implementation of crystal plasticity into finite element method) for 2D plane strain unit cell model of FCC crystal.· The impact of twinning activity and insufficient number of easy slip modes on the void growth and possible ductile failure scenario in HCP crystals have been investigated using large strain CPFEM equipped with a probabilistic twin volume consistent reorientation scheme and employing a unit cell methodology. Both a 2D plane strain unit cell with a cylindrical void and a 3D unit cell with a spherical void have been considered in this analysis. The influence of active deformation mechanisms, stress heterogeneity, and twinning-induced lattice rotation have also been examined, highlighting critical role of strong crystal anisotropy in void behaviour.· A new micromechanical mean-field model for porous elasto-viscoplastic polycrystals has been formulated in small strain format. The closed-form of macroscopic constitutive law for porous polycrystals has been obtained from the proposed three-scale micro-macro transition scheme.· The predictions of the proposed mean-field model have been validated with respect to the corresponding full-field unit cell CPFEM computations for both FCC crystals and polycrystals in terms of the overall and per-grain stress-strain responses.· The extension of the yield criterion proposed in the literature(Paux et al., 2018), enabling its application to crystals deforming by slip and twinning, has been formulated. The tuning parameters in the extended yield surface have been calibrated by considering both slip and twinning in HCP crystals of high plastic anisotropy independently employing two methods: numerical one based on CPFEM analysis of 3D unit cell and analytical one through kinematic limit analysis. For the application of the latter method a new numerical scheme has been developed to determine the so-called anisotropy parameter in the yield surface. Parameters obtained by two methods were in very good agreement.· Additionally, a new GTN-type yield criterion has been formulated based on the proposed micromechanical approach for voided elasto-viscoplastic crystals, with the tuning parameters calibrated using full-field finite element analyses. The predictions of the proposed criterion have been compared with existing models for FCC crystals.Building on the micromechanical mean-field model proposed in the thesis and the analysis of the obtained results, there is clear potential for future research. The proposed yield criterion for porous crystals can be further enhanced and incorporated into a finite element framework with the large strain crystal plasticity,

enabling accurate predictions of damage in single crystal and polycrystal models that exhibit both HCP and FCC symmetry. In the context of the micromechanical mean field model, depending on the relation between void and grain size, the reverse order of homogenization steps can be employed. Accordingly, if the void size is much larger than the grain size, this approach will involve applying a self-consistent scheme for grain aggregate without voids, and next the obtained effective properties of the polycrystal will be used as a matrix material, into which voids are incorporated. Next, the Mori-Tanaka scheme will be employed to compute the effective properties of the resulting porous material. Finally, if voids are of similar size as grains then the one-step homogenization with the self-consistent scheme can be applied. Moreover, it has been noted in the literature that mean field models incorporating second moments of stress yield a softer response compared to those relying solely on first moment of stress (i.e. mean values) and enable to predict yielding under purely hydrostatic loading. Consequently, attention should be directed toward incorporating the second moment of stress in the proposed framework to further improve its predictions. It is also interesting to analyse the macroscopic response of porous crystals under cyclic and non-proportional loading using both, proposed micromechanical models, and full-field unit cell computations. Finally, as research focuses on micro-scale problems, it is crucial to consider length scales. Incorporating the gradient effects of field quantities will facilitate the development of non-local crystal plasticity models incorporating damage.

3. biomedical engineering

Achievement Description

SCIENTIFIC DISCIPLINE: BIOMEDICAL ENGINEERINGDissertation tittle: Advancing biomedical engineering through nanostructured soft platformsDissertation author: Yasamin Ziai, MSc., Eng. Supervisor: Assoc. Prof. Filippo Pierini, PhD., DSc.. Biomedical engineering is a dynamic and interdisciplinary field that continuously evolves to address pressing healthcare challenges through material science and nanotechnology. The doctoral research of Yasamin Ziai, “Nanostructured Soft Platforms Based on the Combination of Nanofibers and Hydrogels for Biomedical Applications,” contributes significantly to this landscape by developing advanced biomaterials with enhanced mechanical stability, biocompatibility, and functionality. By integrating electrospun nanofibers, hydrogels, and plasmonic nanoparticles, her work has led to the development of multi-layered nanostructured systems designed for biosensing applications and neural interfaces, pushing the boundaries of early disease detection, non-invasive diagnostics, and bioelectronic interfaces.The foundation of this research is the strategic combination of nanofibers and hydrogels—two classes of materials that, despite their individual advantages, present challenges when used separately. Electrospun nanofibers offer high surface area, tunable porosity, and excellent mechanical support, making them ideal for bio-interfaces and scaffold-like structures. Hydrogels, on the other hand, provide a hydrated, three-dimensional environment that mimics natural tissues, making them suitable for biosensing, drug delivery, and regenerative medicine. However, hydrogels often suffer from poor mechanical stability, whereas nanofibers lack sufficient biological functionality. By combining these two materials into layered nanostructures, I have created hybrid biomaterials that synergize mechanical robustness with bioactivity, unlocking new possibilities for biomedical applications. A key aspect of Ziai`s research is the integration of plasmonic nanoparticles (gold and silver) into these layered nanoplatforms. The incorporation of plasmonic nanomaterials enhances the optical, sensing, and antibacterial properties of the resulting biomaterials, making them highly effective in biomedical diagnostics. This novel combination has led to the development of advanced biosensing platforms, capable of detecting biomarkers at extremely low concentrations, thereby improving diagnostic sensitivity and enabling real-time monitoring of health conditions.One of the most impactful part of the doctoral research of Y. Ziai is the fabrication of a chameleon-inspired, multi-layered biosensing platform, designed for the non-invasive detection of glucose in bodily fluids. Inspired by the unique ability of chameleon skin to change color based on external stimuli, I have engineered a biomaterial platform in which plasmonic silver nanocubes, embedded within a thermo-responsive hydrogel, exhibit optical shifts in response to varying glucose concentrations. This innovation eliminates the need for external power sources, enabling a sensitive, self-responsive detection system. This platform is particularly significant for diabetes monitoring, as it allows for glucose detection in urine rather than blood, providing a less invasive alternative to traditional blood glucose tests. Given the increasing prevalence of diabetes worldwide, such advancements have the potential to improve patient compliance and the overall quality of glucose monitoring, ultimately leading to better disease management and early intervention. Beyond glucose sensing, Ziai`s research also introduces a lysozyme-sensitive plasmonic hydrogel nanocomposite, tailored for colorimetric detection of dry-eye inflammation. Lysozyme is a key biomarker for ocular health and immune response, and its abnormal levels are linked to dry-eye disease, infections, and inflammatory conditions. By integrating silver nanoplates within a layered nanofiber-hydrogel composite, I have developed a diagnostic tool that enables real-time, visible color changes, allowing patients to self-monitor their eye health without requiring specialized laboratory equipment. The localized surface plasmon resonance (LSPR) shift of embedded nanoparticles ensures that even minute fluctuations in lysozyme concentration can be detected, demonstrating the high sensitivity of this system.The impact of these biosensing platforms extends beyond laboratory settings, as they pave the way for at-home diagnostics, reducing the burden on healthcare facilities while promoting early disease detection and proactive medical intervention. The combination of colorimetric and plasmonic sensing enables easy interpretation of results, eliminating the need for complex instrumentation and making these platforms accessible to a wider population, including those in resource-limited settings.Another major contribution of Y. Ziai`s doctoral research lies in the advancement of biomaterials for brain-machine interfaces (BMIs). Neural interfaces require materials that can establish long-term, stable contact with delicate neural tissues while maintaining mechanical flexibility, biocompatibility, and conductivity. Conventional materials used in BMIs, such as silicon or metals, often suffer from mechanical mismatch with soft brain tissue, leading to chronic inflammation, scar tissue formation, and signal degradation over time. To address these challenges, her research has explored conducting polymer-based nanostructured materials, engineered to improve signal transduction, biointegration, and long-

term stability of neural implants. By incorporating electrospun nanofibers and hydrogel coatings into BMI electrodes, we have developed interfaces that reduce foreign body response, ensuring high-fidelity neural signal recording and stimulation. These materials not only enhance the electrical conductivity of neural interfaces but also offer an environment conducive to neuronal adhesion and growth, promoting better integration with surrounding neural tissue. Furthermore, the design of flexible, biocompatible coatings for chronic neural implants, results in prolonging the lifespan of bioelectronic devices. These advancements hold significant promise for neuroprosthetics, deep brain stimulation, and neurorehabilitation, opening new avenues for treating neurological disorders, spinal cord injuries, and cognitive impairments.The findings and innovations generated throughout her doctoral research, alongside with review papers in the same field, have been published in high impact factor journals of biomedical engineering and represent a multifaceted contribution to the fields of biosensing, neural engineering, and advanced biomaterials development. This research not only deepens our understanding of nanostructured biomaterials but also establishes a foundation for next-generation medical devices that are highly sensitive, non-invasive, and adaptable to complex biomedical environments. The combination of nanotechnology and bioengineering explored in her work has far-reaching implications, from early disease diagnostics to bioelectronic implants and regenerative medicine. Looking ahead, the continued evolution of these materials holds promise for even more sophisticated biosensors, wearable diagnostic tools, and smart implants. The scalability, affordability, and versatility of these platforms suggest widespread clinical translation, bridging the gap between innovative laboratory research and real-world medical applications.In other words, the doctoral research of Yasamin Ziai stands as a testament to the transformative power of multidisciplinary innovation, demonstrating how the synergy of materials science, biomedical engineering, and nanotechnology can revolutionize modern healthcare and improve lives worldwide.

4. information and communication technology

Achievement Description

DISCIPLINE: COMPUTER SCIENCE AND TELECOMMUNICATIONS Doctoral thesis title: Control methods, design optimization and functionality of modular manipulators with an excess number of degrees of freedom Thesis author: Elżbieta ZawidzkaSupervisor: Łukasz JankowskiAssociate supervisor: Jacek Szklarski The doctoral thesis of Ms. Elżbieta Zawidzka is carried out as part of the OPUS 17 research project of the National Science Centre entitled "Arm-Z: extremely modular hyper-redundant economic manipulator – development of control methods and efficiency analysis".Topic of the thesis Ms. Zawidzka's doctoral thesis concerns the issues of control and optimization of hyper-redundant modular manipulators. This topic is not only original in terms of research, but also has significant application potential. In practice, many functional robot manipulator systems are known, but modular systems constitute a relatively small group of them. The area of application of such manipulators usually concerns extreme environments, where safety, reliability and the possibility of quick repair by simple replacement of damaged modules are key.Ms. Zawidzka's work concerns a specific subgroup of modular manipulators, namely hyper-redundant systems, i.e. systems with an excess number of degrees of freedom. In such manipulators, the number of degrees of freedom is closely correlated with the number of modules and – compared to conventional industrial manipulators – significantly greater than their minimum theoretically necessary for full penetration of the workspace. Such systems are the most difficult to design and control, but they offer great utility benefits due to the possibility of economizing their production and use.In her work, Ms. Zawidzka focused on a special case of a specific modular manipulator with a tubular cross-section. Such a manipulator consists of a series of identical modules and is conceptually and visually close to manipulators of the "elephant's trunk" type. Each of its modules has one degree of freedom corresponding to rotation with respect to the previous module, and the plane of connection between subsequent modules is inclined with respect to their axis (it is not perpendicular to it). Therefore, the rotation of each module causes the rotational movement of the entire remaining part of the manipulator and the end effector: each of their points describes a circle, the radius, center and axis of which depend in a relatively complex way on the degrees of freedom of all previous modules.The subject of the PhD student's work is interesting for research due to the specificity of the systems under consideration, the high degree of complexity of which results not so much from the nature of their essentially simple components (single modules), but from the complex nature of the mutual interactions of many conceptually simple components. The tasks of designing, optimizing and especially controlling this type of manipulators lead to highly nonlinear and computationally difficult problems, which favors solutions using computational intelligence and machine learning methods.Scope of researchThe research conducted by Ms. Elżbieta Zawidzka focuses on challenges in three main areas:A. Motion planning and manipulator control.B. Optimization of the design of a single module (taking into account the structure and geometric configuration of the entire manipulator).C. Making physical prototypes and experimental tests.Ad. A) Ms. Zawidzka developed and verified a number of concepts for controlling a hyper-redundant manipulator. The considered task formulations included not only reaching the designated points of the workspace by the manipulator end effector, but also planning the path of movement in a complex environment in such a way as to avoid collisions of any manipulator module with possible obstacles.In the first stage of implementation, the PhD student's work focused on a special simplified version of a two-dimensional (2D) manipulator. In such a manipulator, each module assumes only one of two possible positions: rotation by $-\pi/6$ or $\pi/6$ relative to the previous module, which causes its space of final states to be discrete. Despite the limited movement possibilities at the level of a single module, it was shown that longer manipulators (e.g. 24-module) are able to effectively penetrate their workspace, i.e. bypass obstacles and reach designated areas.In the next stages of the research, the PhD student extended the approach to three-dimensional space with a modular manipulator with a tubular cross-section performing movements in three dimensions. In order to plan the movements of such a manipulator, in particular its effective creep using dry friction, machine learning methods (soft actor-critic reinforcement learning) were used. Additionally, concepts of using the manipulator in the implementation of various objects of small street kinetic architecture were proposed and published, such as a mechanical solar tracking system, a spiral column with adjustable height, a kinetic bionic sculpture, a kinetic sprinkler/fountain and others.In order to formalize

the description of the manipulator kinematics, Ms. Zawidzka used the classical Denavit–Hartenberg notation. Some of the numerical simulations were performed in the Matlab/Simulink/Robotics Toolbox environment, and some using the Python language and the PyBullet engine. The developed methods also potentially enable real-time control, which is important in applications requiring rapid adaptation to environmental conditions that change over time.Ad. B) Due to the modular nature of the manipulator, the optimization of its structure should be carried out primarily locally, i.e. at the level of a single module. However, the mechanical loads to which each module is locally subjected depend on: (1) the position of the module along the manipulator, (2) the planned load of the entire manipulator and (3) its instantaneous global geometric configuration. The PhD student used such an analysis scheme to determine the limits of the range of useful loads of a single module. The maximum values of the determined loads (axial loads, shear, bending and – in the case of three-dimensional structures – also torsion) were then used in the process of topological optimization of the internal structure of a single module. The calculations were initially performed for a two-dimensional model of the module, and then for a three-dimensional model of a flat manipulator and a tubular manipulator consisting of six modules. The PhD student used two different approaches to topological optimization of the structure with multiple loads: she determined an average solution and a solution that was the envelope of individual solutions. The use of the geometric stiffness matrix in the three-dimensional case allowed for taking into account local and global buckling. The computational example was relatively complex: the model of a single module used 56,520 finite elements (345,714 degrees of freedom), which allowed for maintaining a relatively high spatial resolution of the obtained results.The numerical optimization process was carried out using the universal programming tool MorphoGen, developed by the team and published in open access, used for topological optimization of elastic and elastic-plastic structures with stress, reliability and fatigue constraints.Ad. C) Ms. Elżbieta Zawidzka, in cooperation with the design team and the Industrial Institute of Automation and Measurements PIAP, developed and tested several physical prototypes of 3D manipulators. Initial tests allowed to define the scope of practical requirements and technical limitations that should be met by the modules of the fully functional version of the manipulator. The prototyping process then included CAD design, simulation studies carried out using the MATLAB/Simulink environment, practical implementation of structural elements (including additive methods from PET-G material), design and manufacture of drive systems and assembly of electrical elements (drive motor, cables) and - in each module - a set of cylindrical and conical gears. Finally, four physical modules were created, connected into a four-module manipulator. In its current version, the drive is applied directly to the first module and then transferred using internal transmission systems to subsequent modules. In the target version, each manipulator module will be equipped with a dedicated stepper motor controlled by the Arduino system.

5. automation, electronics and electrical engineering

Achievement Description

Since 2022 Institute of Fundamental Technological Research of the Polish Academy of Sciences does not have permission in the discipline “Automatics, electronics and electrotechnics”, which is why the Doctoral School of IPPT PAN does not provide education in its field.

ATTACHMENTS

Added files

Adequacy of the education program and individual research plans to the learning outcomes for qualifications at PRK level 8 and their implementation

- Study_Programmes_Offered_at_The_Doctoral_School_of_IPPT_PAN.pdf

Method of verifying learning outcomes for qualifications at PRK level 8

- MODIFIED EDUCATION PROGRAM AT THE DOCTORAL SCHOOL OF IPPT PAN_all.pdf

Qualifications of academic teachers or research staff conducting education at the doctoral school

- Lect._Mechanical_Eng.pdf
- Lect._Biomedical_Eng.pdf
- Lect._Techn_CS_&_Tel.pdf
- Lect_Materials_Eng.pdf
- Wykl-Lect-AE&E.pdf

Quality of the recruitment process

- Recruitment_and_Admissions_to_The_Doctoral_School_of_IPPT_PAN.pdf
- Regulations_of_The_Doctoral_Schoool_of_IPPT_PAN.pdf
- Recruitment Commissions.pdf

Quality of scientific or artistic supervision and support for conducting scientific activities

- Regulations_of_The_Doctoral_Schoool_of_IPPT_PAN.pdf

STATEMENTS

- I hereby declare that the information contained in the self-assessment report is fully consistent with the factual and legal status.
- I hereby declare that the information contained in the self-assessment report in Polish and English is fully identical in substance.
- I hereby declare that the documents attached to the self-assessment report in Polish and English are fully identical in substance.

Signature

AUTHORIZATIONS

Added files

powołanie T Burczynski 2021_2025.PDF

STUDY PROGRAMMES OFFERED AT THE DOCTORAL SCHOOL OF IPPT PAN

§1

Study programmes offered to PhD students (pursuant to art. 201 of the Act) at the Doctoral School of IPPT PAN are individual and involve the following forms of academic activity:

1) lectures, classes and seminars organized and conducted by the Institute's own academic staff and using its own research facilities. Every semester, the Director of the Doctoral School of IPPT PAN publishes a list of teaching programmes currently offered at the ITTP PAN,

2) lectures, classes, laboratory classes and seminars conducted by the academic research and teaching staff from other scientific centres, also on the premises of other scientific institutions. The abovementioned forms of academic activity may also be organized jointly by the IPPT PAN and other research centres,

3) national and international schools, workshops and scientific conferences,

4) research internships and teacher training in other research centres in Poland and abroad,

5) events popularizing science and academic methodology, run or co-run by PhD students,

6) own studies in the field of science or research methodology related to the PhD thesis (e.g. study of scientific literature related to the subject of the PhD thesis).

§2

Every semester, PhD students shall consult their individual study programme (including the obligatory teaching classes) with their supervisor or supervisors or with their supervisor and subsidiary supervisor. They shall also inform the Director of the Doctoral School of IPPT PAN as well as the Scientific Board's Committee for Academic Staff Training or the Doctoral Committee of the study programme, and carefully realize it. Every PhD student is issued with a student book in which he/she is obliged to record all the courses included in their study programme each semester. The student book should include student's personal data, his/her study programme, exam results and other information relevant to the programme.

§3

1. At the end of each academic year, PhD students are obliged to submit their credits obtained in all the courses they attended under their individual study programme to the Director of the Doctoral School of IPPT PAN, as required by the Act and regulations issued by the Ministry of Science and Higher Education.

2. The courses as well as entrance exams and doctoral exams are graded according to the following grading scale: unsatisfactory (2), satisfactory (3), quite good (3.5), good (4), above good (4.5), very good (5).

3. Courses offered by the Doctoral School of IPPT PAN may also be graded in a form proposed by the course teacher or by minimum one supervisor, other than the grading system set out in section 2 above. In such a case, there are two options: pass and fail.

Warsaw, 28 March 2019

EDUCATION PROGRAM AT THE DOCTORAL SCHOOL OF IPPT PAN

§1

1. The aim of education at the Doctoral School of IPPT PAN is to prepare doctoral students to obtain a doctoral degree by acquiring the qualifications necessary for scientific activities, conducting scientific research and preparing a doctoral dissertation.

2. Study programmes offered to PhD students (pursuant to art. 201 of the consolidated text of the Act "Law on Higher Education and Science" of 20 July 2018, Journal of Laws item 1668, as amended, hereinafter referred to as the "Act") at the Doctoral School of IPPT PAN are individual. The individual study programmes at the Doctoral School of IPPT PAN provides for the following forms of teaching of academic activity:

1) Lectures, classes and seminars organized and conducted by the Institute's own academic staff and using its own research facilities. Every semester, the Head of the Doctoral School of IPPT PAN publishes a list of teaching programmes currently offered at the IPPT PAN;

2) Syllabuses of lectures and exercises and a list of seminars organized and conducted using IPPT PAN's own scientific staff are included in the currently updated program offer of the Doctoral School of IPPT PAN available on the website of IPPT PAN. The Head of the Doctoral School of IPPT PAN prepares syllabus forms for subjects included in the didactic offer of the Doctoral School of IPPT PAN.

3) Before starting each semester of studies at the Doctoral School of IPPT PAN, the doctoral student, in consultation with his/her supervisor or supervisors or supervisor and auxiliary supervisor, may choose from this offer the classes he/she will attend, or choose other classes listed in point 8.

4) Due to organizational limitations, the Doctoral School of IPPT PAN launches a given lecture and exercises provided that this subject is chosen by at least 3 doctoral students from IPPT PAN.

5) Since the Institute of Fundamental Technological Research of the Polish Academy of Sciences is an institute of engineering and technical sciences, and mathematics is the basic tool of research work of doctoral students of the Doctoral School of IPPT PAN, regardless of the scientific discipline within which the doctoral thesis is carried out, a two-semester subject entitled "Basic mathematics in engineering science" in the form of lectures and auditorium exercises and a one-semester subject entitled "Fundamentals and Application of Tensor Calculus in Continuum Mechanics", also in the form of lectures and auditorium exercises, are obligatory for all first-year students.

6) For first-year students working on doctoral theses in the discipline of "Mechanical Engineering" and "Materials Engineering", a one-semester subject entitled "Mechanics of Continuum " in the form of lectures and auditorium exercises is obligatory.

7) Doctoral students of the Doctoral School of IPPT PAN who are working on their doctoral theses in other scientific disciplines in which IPPT PAN is authorized to conduct research, i.e. "Technical computer science and telecommunications" and "Biomedical engineering", in consultation with their supervisors are required to attend selected didactic classes that will allow them to deepen their basic knowledge in these disciplines. These classes may be conducted at IPPT PAN, as well as in other academic units.

8) Lectures, classes, laboratory exercises and seminars can be conducted by the academic research and teaching staff from other scientific centres, also on the premises of other scientific institutions. The abovementioned forms of academic activity may also be organized jointly by the IPPT PAN and other research centres.

9) Classes for doctoral students with citizenship other than Polish are conducted in English, and for doctoral students with Polish citizenship in Polish or English.

10) The Head of the Doctoral School of IPPT PAN, in agreement with the supervisor or supervisors or the supervisor and the auxiliary supervisor, may introduce mandatory didactic classes into the individual doctoral student's education programme.

§ 2

The individual education program at the Doctoral School of IPPT PAN also provides for the following forms of scientific activity in the form of participation in:

1) national and international schools, workshops and scientific conferences,

2) research internships and teacher training in other research centres in Poland and abroad,

3) events popularizing science and academic methodology, run or co-run by PhD students,

4) own studies in the field of science or research methodology related to the PhD thesis (e.g. study of scientific literature related to the subject of the PhD thesis).

5) doctoral student delivering seminars on the scientific subject of the doctoral thesis at least once per academic year, in the presence of the supervisor or supervisors or the supervisor and auxiliary supervisor, as well as other specialists in a given discipline or related disciplines.

§ 3

1. The education program at the Doctoral School of IPPT PAN enables the acquisition of knowledge, skills and social competences required for level 8 of the Polish Qualifications Framework listed in the Regulation of the Minister of Science and Higher Education of 14 November 2018, item 2218 on the characteristics of the second level of learning outcomes for qualifications at levels 6-8 of the Polish Qualifications Framework.

2. Learning outcomes are achieved as a result of:

   1) implementation of an individual education program;

   2) implementation of an individual research plan;

   3) staying in the academic environment of the Doctoral School of IPPT PAN and participating in various forms of activities organized by it;

   4) participation in the life of the academic community - national and international;

   5) self-education.

3. As a result of education at the Doctoral School of IPPT PAN, the following learning outcomes are achieved:

Reference to 8th PQF	Description
In terms of knowledge – the graduate knows and understands:	
P8S_WG	to the extent that it allows for the revision of existing paradigms – global achievements, covering theoretical foundations and general issues and selected specific issues – appropriate for the represented scientific discipline, including the latest scientific achievements in the area of conducted research
P8S_WG	the main development trends of the scientific disciplines in which education takes place and the related research methodology
P8S_WG	principles of disseminating the results of scientific activities, also in open access mode
P8S_WK	fundamental dilemmas of modern civilization
P8S_WK	economic, legal, ethical and other important conditions for scientific activity, including research financing mechanisms
P8S_WK	basic principles of knowledge transfer to the economic and social sphere and commercialization of scientific results and know-how related to these results
In terms of skills – the graduate can:	
P8S_UW	use knowledge from various fields of science to creatively identify, formulate and innovatively solve complex problems or perform research tasks, in particular: • define the purpose and subject of research, formulate a research hypothesis; • develop research methods, techniques and tools and use them creatively; • draw correct conclusions based on research results
P8S_UW	critically analyze and evaluate the results of scientific research, expert activity and other creative work and their contribution to the development of knowledge, in particular assess the usefulness and possibility of using the results of theoretical work in practice
P8S_UW	transfer the results of scientific activities to the economic and social sphere
In terms of communication – the graduate is able to:	
P8S_UK	communicate on specialist topics relevant to the scientific discipline represented, to a degree that enables active participation in the national and international scientific community, including within international consortia of research universities
P8S_UK	disseminate the results of scientific activities, also in popular forms
P8S_UK	initiate debate and participate in scientific discourse and provide appropriate arguments in scientific discussions and public debates on various topics
P8S_UK	use a foreign language (English) at level B2 of the Common European Framework of Reference for Languages to a degree that allows participation in an international scientific and professional environment

P8S_UO	plan and implement – in a methodologically correct manner – individual and team research or creative projects, also in an international environment
P8S_UU	independently plan and act for their own development and inspire and organize the development of others, including by planning or participating in research projects
P8S_UU	plan – in a methodologically correct manner – didactic classes or groups of classes and implement them using modern methods and tools
In terms of social competences – the graduate is ready to:	
P8S_KK	critical evaluation of achievements within the represented scientific discipline
P8S_KK	critical evaluation of one's own contribution to the development of the represented scientific discipline
P8S_KK	recognizing the importance of knowledge and scientific achievements in solving cognitive and practical problems
P8S_KO	fulfilling the social obligations of researchers and creators
P8S_KO	initiating action in the public interest
P8S_KO	thinking and acting in a creative and entrepreneurial way
P8S_KR	behaving in a professional manner, respecting the principles of professional ethics, maintaining and developing the ethos of research and creative environments, including: • conducting scientific activities independently, • respecting the principle of public ownership of the results of scientific activities, taking into account the principles of intellectual property protection

§ 4

The program requirements for the Doctoral School of IPPT PAN are the requirements that must be met by the education program implemented by each doctoral student at this school. They specify the minimum number of didactic classes and forms of scientific activity listed in § 2, which must be approved by the supervisor or supervisors, or the supervisor and auxiliary supervisor, the head of the Doctoral School of IPPT PAN and the relevant Committees of the Scientific Council of IPPT PAN during the doctoral proceedings. The general minimum program for all doctoral students of the Doctoral School of IPPT PAN includes passing all compulsory subjects in accordance with § 1, points 5 and 6, passing at least 3 elective subjects, participating in at least one summer school, or completing at least one scientific and teaching internship and delivering one seminar in each year of studies organized in a specific department of IPPT PAN.

§ 5

A doctoral student is responsible for agreeing on his/her individual education program for each semester (including the teaching classes he/she is required to attend) with his/her supervisor or supervisors or supervisor and auxiliary supervisor, for informing the Head of the Doctoral School of IPPT PAN and the Committee for the Education of Academic Staff of the Scientific Council of IPPT PAN or the Doctoral Committee, and for conscientiously carrying it out. The

doctoral student receives an index book, in which he/she enters all classes of each semester based on the established program of studies and receives credits for these classes from the lecturers conducting them. The index book contains personal data, course of studies, exam results and other information related to the studies. In particular, all seminar presentations of the doctoral student are entered, confirmed by an independent researcher conducting the given seminar.

§6

1. At the end of each academic year, PhD students are obliged to submit their credits obtained in all the courses they attended under their individual study programme to the Head of the Doctoral School of IPPT PAN, as required by the Act and regulations issued by the Ministry of Science and Higher Education.
2. The courses as well as entrance exams and doctoral exams in the Doctoral School of IPPT PAN are graded according to the following grading scale: unsatisfactory (2), satisfactory (3), quite good (3.5), good (4), above good (4.5), very good (5).
3. Courses offered by the Doctoral School of IPPT PAN may also be graded in a form proposed by the course teacher or by supervisor, other than the grading system set out in section 2 above. In such a case, there are two options: pass and fail.

§ 7

During doctoral studies at the Doctoral School of IPPT PAN, the doctoral student is required to participate passively and actively in seminars. During the seminars, the doctoral student learns to present his/her own scientific activity and lead a scientific discussion. Seminars for doctoral students with citizenship other than Polish are conducted in English, and for doctoral students with Polish citizenship in Polish or English.

§ 8

The condition for graduation from the Doctoral School of IPPT PAN is to submit a doctoral dissertation and obtain a certificate signed by the Head of the Doctoral School of IPPT PAN on achieving learning outcomes at level 8 of the Polish Qualifications Framework and meeting the requirements of this Education Program, in accordance with the provisions of § 4 approved by the Head of the Doctoral School of IPPT PAN.

§ 9

The annexes to this Education Program at the Doctoral School of IPPT PAN are the syllabus forms of subjects included in the didactic offer of the Doctoral School of IPPT PAN.

Warsaw, December 6, 2024

THE DOCTORAL SCHOOL OF IPPT PAN

COURSE OFFERED IN THE DOCTORAL SCHOOL OF IPPT PAN

Name of the course	Polish	
	English	
Type of the course		
Course coordinator		Course teacher
Implementing unit		Scientific discipline / disciplines
Level of education		Semester
Language of the course		
Type of assessment		Number of hours in a semester
ECTS credits		

Type of classes		Lecture	Auditory classes	Project classes	Laboratory	Seminar
Number of hours	in a week					
	in a semester					

1. Prerequisites

2. Course objectives

3. Course content (separate for each type of classes)
Lecture
Laboratory

4. Learning outcomes			
Number of the learning outcome	Learning outcomes description	Reference to the learning outcomes according to the 8th level of PRK	Learning outcomes verification methods*
Knowledge			
1			
2			
3			

Skills			
1			
2			
3			
4			
Communication			
1			
2			
3			
Social competences			
1			
2			

*Allowed learning outcomes verification methods: exam; oral exam; written test; oral test; project evaluation; report evaluation; presentation evaluation; active participation during classes; homework; tests

5. Assessment criteria

6. Literature
Primary references:
[1]
[2]
Secondary references:
[1]
[2]

7. PhD student's workload necessary to achieve the learning outcomes**		
No.	Description	Number of hours
1	Hours of scheduled instruction given by the lecturer in the classroom	
2	Hours of consultations with the lecturer, exams, tests, etc.	
3	Amount of time devoted to the preparation for classes, preparation of presentations, reports, projects, homework	
4	Amount of time devoted to the preparation for exams, test, assessments	
	Total number of hours	
	ECTS credits	

** 1 ECTS = 25–30 hours of the PhD students work (2 ECTS ≈ 60 hours; 4 ECTS ≈ 110 hours, etc.)

SCIENTIFIC DISCIPLINE: MECHANICAL ENGINEERING

1. Prof. Stanisław Stupkiewicz, PhD, DSc, Mech. Eng., Corresponding Member of the Polish Academy of Sciences

Biographical note:

Stanisław Stupkiewicz is a professor at the Institute of Fundamental Technological Research of the Polish Academy of Sciences (IPPT PAN) in Warsaw, where he is the head of the Department of Materials Mechanics. He is a graduate of the Warsaw University of Technology (1989), and obtained his doctorate (1996) and habilitation (2006) at IPPT PAN. He has been a full professor since 2011. In 2013, he spent a year in Italy as a visiting professor at the University of Trento.

His research interests include micromechanics of interfaces and interfacial layers, scale effects, multiscale modeling of shape memory alloys, modeling of microstructure evolution using the phase-field method, constitutive modeling of contact phenomena, contact mechanics, plasticity, crystal plasticity and computational mechanics.

A gradient model of pseudoelasticity of shape memory alloys in the finite strain range has been developed. Including gradient effects allows modeling of strain localization effects, which lead to the formation and propagation of macroscopic phase transformation fronts with complex shapes consistent with experimental observations. A material deformation model has also been developed, taking into account the coupling of mechanical twinning with crystal plasticity. The model describes the evolution of the material microstructure due to twinning using the phase-field method. The model has been used, among others, to simulate the problem of micro- and nano-indentation.

Since 2020, he has been a corresponding member of the Polish Academy of Sciences. He is an editor of the journal Mechanics of Materials, an editor of the Archives of Mechanics section, and a member of the editorial board of the Archive of Applied Mechanics.

Most important scientific achievements in the recent period (6 years):

The most important achievements are related to modeling the evolution of microstructure in materials such as shape memory alloys undergoing martensitic phase transformation and magnesium alloys undergoing twinning. A number of models have been developed in which the interfaces are treated as fuzzy surfaces, which allows the use of effective computational algorithms.

Selected publications:

K. Tuma, M. Rezaee-Hajidehi, J. Hron, P.E. Farrell, S. Stupkiewicz, Phase-field modeling of multivariant martensitic transformation at finite-strain: Computational aspects and large-scale finite-element simulations, Comp. Meth. Appl. Mech. Eng. 377, 113705, 2021.

M. Rezaee-Hajidehi, P. Sadowski, S. Stupkiewicz, Deformation twinning as a displacive transformation: Finite-strain phase-field model of coupled twinning and crystal plasticity, J. Mech. Phys. Solids 163, 104885, 2022.

M. Rezaee-Hajidehi, S. Stupkiewicz, Predicting transformation patterns in pseudoelastic NiTi tubes under proportional axial-torsion loading, Int. J. Solids Struct. 281, 112436, 2023.

Research projects:

New computational methods in modeling sharp and diffuse discontinuity surfaces, NCN OPUS, 2019-2022.

The influence of diffusion on the formation of omega phase in metastable beta titanium alloys: micromechanical modeling using the phase field method, NCN OPUS-LAP (implemented in cooperation with Charles University, Prague, Czech Republic), 2024-2027.

Other teaching experiences:

Lectures at the course "Computational mechanics for novel design of advanced materials", CISM, Udine, Italy, 4-8/10/2021 (6 hours).

Lectures at the course "Plastic Anisotropy and Damage from Single Crystal to Engineering Scale", CISM, Udine, Italy, 22-26/05/2023 (6 hours).

Supervisor of three doctorates defended with distinction: M. Wichrowski (2021), M. Lewandowski (2021), J. Dobrzański (2024) – doctoral students of the Doctoral Studies of IPPT PAN.

Bibliometric indicators:

87 articles in journals from the JCR list

2514 citations, H=30 according to the Scopus database

2. Wasyl Kowalczuk, PhD, DSc

Scientific achievements in the field of engineering and technical sciences, in the scientific discipline of mechanical engineering:

Topics of conducted research:

1. Classical and quantum systems on Lie groups and their homogeneous spaces. Dynamics of deformable bodies and mutual coupling between rotations and deformations.
2. Dynamic affine models in manifolds with general connection and metric tensor (which can be independent or related to each other). Analysis of selected two-dimensional special cases, including sphere, pseudo-sphere, torus, cylinder, helicoid, catenoid, Mylar balloon, unduloid, nodoid, spheroid, lambda-sphere (as a reference model for the geoid), etc.
3. Description of two-dimensional deformable bodies immersed in three-dimensional physical space, whose thickness performs one-dimensional oscillations orthogonal to the two-dimensional central plane (imposed Kirchhoff-Love type constraints).
4. Dynamics of deformable bodies with imposed additional constraints of simple geometric structure (e.g. defining irrotational motion). Analysis of an alternative to the traditional description of the mechanism of taking into account constraints (i.e. using d'Alembert's variational principle) vaconomic description, which is based on Lusternik's theorem, i.e. introducing constraints directly to the variational principle together with Lagrange multipliers and passing to the corresponding free variational principle without constraints.
5. Propagation of waves in inhomogeneous dielectric media with a variable refractive index. It turns out that during periodic modulation of the refractive index of the medium, the phenomenon of

resonance or antiresonance can occur, i.e. there are exponentially growing/decaying solutions of the wave equation. Such a periodic structure of the medium is characteristic, for example, for Bragg optical waveguides or multilayer interference mirrors.

Participation in the Team of Experts (scope: science and technology) of the National Centre for Research and Development (NCBR) under the Smart Growth Operational Programme (POIR) – European Structural and Investment Funds, from 2016 to the present.

National/international awards for scientific achievements:

1. Award of the Director of the Institute of Fundamental Technological Research of the Polish Academy of Sciences, 3rd degree (individual) in the category: scientific achievements in 2020.

Teaching achievements include conducting classes:

1. From 2016 to the present, Doctoral School of the IPPT PAN, preparation and delivery of lectures in English: "Basic mathematics in engineering science" (60 hrs.), "Numerical methods for solving ordinary and partial differential equations" (30 hrs.), "Partial differential equations of mathematical physics" (30 hrs.), "Elements of mathematical statistics with the usage of programming language R" (30 hrs.).

2. From 2020 to the present, Academy of Applied Sciences in Warsaw (formerly: Higher School of Ecology and Management in Warsaw), preparation and delivery of lectures, exercises and design classes in Polish: "Theory of elasticity and plasticity" (40 hrs.), "Prestressed structures" (20 hrs.).

3. From 2020 to the present, Polish-Japanese Academy of Information Technology in Warsaw, preparation and conducting exercises in English: "Calculus" (30 hrs.), "Linear algebra and geometry" (30 hrs.).

4. From 2024 to the present, University of Economics and Humanities in Warsaw, preparation and conducting exercises in English: "Discrete mathematics" (30 hrs.).

Bibliometric indicators (according to Scopus database):

Number of publications: 36, number of citations: 224, Hirsch index: 8.

3. Prof. Katarzyna Kowalczyk-Gajewska, PhD, DSc, Civ. Eng.

Biographical note

She obtained the title of professor in 2022 in the field of technical sciences in the disciplines of mechanical engineering and materials engineering. She specializes in material mechanics and in particular micromechanics, including crystal plasticity and analytical and numerical methods for finding effective properties of inhomogeneous materials.

Project management

In this area, over the last 6 years she has managed two NCN OPUS projects and, on the Polish side, two European projects enabling scientific exchange with the best universities in the USA.

Research activity

She has published 55 articles in prestigious international journals and supervised 3 doctoral students.

Teaching activity

In addition to the Doctoral School of IPPT, she has given guest lectures for doctoral students at the Poznań University of Technology and for master's students at the Warsaw University of Technology.

Organizational activity

She is the editor of the Engineering Transactions journal and a member of the editorial committees of the International Journal of Plasticity (IF=9.2, D1 according to WoS) and Acta Mechanica (IF=2.2, Q2 according to WoS). In 2022, she was the chair and organizer of the IUTAM Symposium on Enhancing Material Performance by Exploiting Instabilities and Damage Evolution and this year she is co-chairing the Euromech Colloquium: Mechanics of Interfaces, which will be held in Metz. She collaborates scientifically with the Carlos III University of Madrid, the University of Lorraine and Texas A&M.

Bibliometric indicators

According to the Web of Science (WoS) database, they are: IH=18, number of all citations: 811, without self-citations 649

According to the Scopus database: IH=19, number of all citations: 894, without self-citations: 726.

Number of publications: 55

4. Prof. Elżbieta A. Pieczyska, PhD, DSc, Mech. Eng.

Scientific and research activities

Development of methodology and conducting experimental verification of thermomechanical couplings in the process of loading innovative materials - titanium alloys and shape memory polymers, not conducted in any research center so far. Management of two NCN projects, promotion of three PhDs.

Organizational and didactic activities

Organization of the New Trends in Experimental Mechanics NTEM1 PhD School in 2024 funded by the European Society for Experimental Mechanics EuraSEM; proposal, organization and lecture for young scientists. Invitation to the Doctoral Commission in Liege. Giving lectures at the invitation of the Research Centers of Belgium, Romania and Japan - Hiroshima and Fukuoka Universities, University of Tsukuba, Tokyo University of Technology, AICHI Institute of Technology, Toyota Central Research & Development Labs. Designing and running the IPPT stand during the Science Picnics at the National Stadium in 2012-2023, assessed by the European Commission as the largest event promoting science.

Bibliometric indicators

- according to SCOPUS database on 12/02/2025:

1) total number of citations: 922,

2) number of citations without self-citations: 643,

3) Hirsch index: 17.

- according to WEB OF SCIENCE database on 12/02/2025::

1) total number of citations: 902,

2) number of citations without self-citations: 663,

3) Hirsch index: 15.

Number of publications: 93

5. Prof. Wiera Oliferuk, PhD, DSc, Eng. (retired professor of IPPT)

Scientific achievements

Introduction of the study of energy transformation during plastic deformation of polycrystals.

Author or co-author of books:

Physics textbooks for general secondary schools with a humanistic profile:

a) Grzegorz Białkowski, Wiera Oliferuk, FIZYKA class I,

b) Grzegorz Białkowski, Wiera Oliferuk, FIZYKA class III part 1,

c) Grzegorz Białkowski, Wiera Oliferuk, FIZYKA class III part 2, (Wydawnictwa Szkolne i Pedagogiczne)

d) Wiera Oliferuk, “Infrared thermography in non-destructive testing of materials and devices” (Publisher: BIURO GAMMA)

Didactic classes outside IPPT parallel to work at IPPT PAN

a) physics teacher in the university class of the 14th General Secondary School named after St. Staszic (formerly: named after Kl. Gottwald).

b) Lecturer of the subject "Thermomechanical aspects of deformation of polycrystalline materials" at the Doctoral Studies at the Faculty of Materials Engineering of the Warsaw University of Technology.

c) Lecturer of the subject "Directions of development of non-destructive testing methods" as part of the Postgraduate Studies at the Faculty of Materials Engineering of the Warsaw University of Technology.

d) Lecturer at the Faculty of Mechanical Engineering of the Białystok University of Technology in the following subjects, for students: Physics, Mechanics of Materials, for PhD students: Thermomechanics, Physical foundations of experimental methods. (lectures given at the Białystok University of Technology until 2019).

Didactic classes at IPPT PAN

a) Lectures selected twice by IPPT PAN PhD students "The physical basis of experimental methods used in mechanics" conducted in English.

b) Currently, a script entitled "The physical basis of experimental methods used in mechanics" is being prepared for future PhD students.

Bibliometric indicators, according to the WEB OF SCIENCE database 14/02/2025:

1) number of citations: 534,

2) number of citations without self-citations: 433,

3) Hirsch index: 14.

SCIENTIFIC DISCIPLINE: BIOMEDICAL ENGINEERING

Prof. Pawel Łukasz Sajkiewicz, PhD, DSc, Eng.

Biographical note and scientific activity

Professor of materials engineering and biomedical engineering, head of the Independent Laboratory of Polymers and Biomaterials at the Institute of Fundamental Technological Research of the Polish Academy of Sciences. Expert in the field of synthetic and natural polymers, their structure and properties, both from a fundamental and application perspective as biodegradable scaffolds for tissue regeneration. Manager and executor of eight scientific projects of the National Science Centre and the National Centre for Research and Development.

Teaching activity

Teaching experience as a supervisor of master's and doctoral theses and a lecturer of classes for students and doctoral students; recent lectures include:

2024/2025 - lecture "Polymers and their applications in tissue engineering" for doctoral students of the Doctoral School of IPPT PAN (30h);

2019-2020 - Lectures for doctoral students under the Knowledge Education Development Operational Program co-financed by the European Social Fund: "Biomaterials in medical sciences" (20h),

"Methodology in scientific research" (10h),

laboratory classes "Biomaterials in medical sciences" (25 h)

2014 - lectures at the International Centre for Mechanical Sciences (CISM), Udine, Italy. "Electrospinning: Exploiting Electrohydrodynamics and Rheology for the Control of Nanofiber Structural and Physical Properties", 8 hours of lecture for students and PhD students, Udine, Italy, 30 participants

2010 -2018 annual 3-hour lectures and laboratory classes for students of the Faculty of Human Nutrition, SGGW, Warsaw, 50 participants

2012, 2011, 2007 - lectures at Istituto di Chimica e Tecnologia dei Polimeri CNR, Pozzuoli, Italy, and Eidgenössische Material Prüfungsanstalt (EMPA), St. Gallen, Switzerland, 10 h

Bibliometric indicators according to Scopus Database (17.02.2025):

Number of publications: 108

Citations: 3571

Citations without self-citations: 3331

Hirsch index: 34

SCIENTIFIC DISCIPLINE:

TECHNICAL COMPUTER SCIENCE AND TELECOMMUNICATIONS

Assoc. Prof. Łukasz Jankowski, PhD, DSc, Eng.

Biographical note

He is employed at IPPT PAN, where he has headed the Department of Intelligent Technologies since 2016. He graduated from the Wrocław University of Science and Technology (computer science) and the University of Wrocław (mathematics); he received his Ph.D. from the University of Potsdam in Germany (physics), and his habilitation at IPPT PAN (mechanics).

Research work

Current research interests include the application of machine learning techniques in the issues of semi-active control, monitoring the technical condition of structures and identification of systems. Supervisor of three doctoral dissertations defended in Poland, co-supervisor of two dissertations defended in China, manager of 4 Opus NCN grants.

Organizational activity

Member of editorial boards of the journals: Computer-Aided Civil and Infrastructure Engineering, Mechanical Systems and Signal Processing, Structural Control & Health Monitoring and others.

Organized the 7th European Conference on Structural Control (EACS 2022).

Bibliographic indicators

- in the Scopus database:

Author of 125 publications

Number of citations: 970

H index = 19

SCIENTIFIC DISCIPLINE: MATERIALS ENGINEERING

Prof. Elżbieta A. Pieczyska, PhD, DSc, Mech. Eng.

Scientific and research activities

Development of methodology and conducting experimental verification of thermomechanical couplings in the process of loading innovative materials - titanium alloys and shape memory polymers, not conducted in any research center so far. Management of two NCN projects, promotion of three PhDs.

Organizational and didactic activities

Organization of the New Trends in Experimental Mechanics NTEM1 PhD School in 2024 funded by the European Society for Experimental Mechanics EuraSEM; proposal, organization and lecture for young scientists. Invitation to the Doctoral Commission in Liege. Giving lectures at the invitation of the Research Centers of Belgium, Romania and Japan - Hiroshima and Fukuoka Universities, University of Tsukuba, Tokyo University of Technology, AICHI Institute of Technology, Toyota Central Research & Development Labs. Designing and running the IPPT stand during the Science Picnics at the National Stadium in 2012-2023, assessed by the European Commission as the largest event promoting science.

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- according to SCOPUS database on 12/02/2025:

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Number of publications: 93

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Author or co-author of books:

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b) Grzegorz Białkowski, Wiera Oliferuk, FIZYKA class III part 1,

c) Grzegorz Białkowski, Wiera Oliferuk, FIZYKA class III part 2, (Wydawnictwa Szkolne i Pedagogiczne)

d) Wiera Oliferuk, “Infrared thermography in non-destructive testing of materials and devices” (Publisher: BIURO GAMMA)

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c) Lecturer of the subject "Directions of development of non-destructive testing methods" as part of the Postgraduate Studies at the Faculty of Materials Engineering of the Warsaw University of Technology.

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b) Currently, a script entitled "The physical basis of experimental methods used in mechanics" is being prepared for future PhD students.

Bibliometric indicators, according to the WEB OF SCIENCE database 14/02/2025:

1) number of citations: 534,

2) number of citations without self-citations: 433,

3) Hirsch index: 14.

Od roku 2022 Instytut Podstawowych Problemów Techniki PAN nie posiada uprawnień w dyscyplinie „Automatyka, elektronika i elektrotechnika”, przez co Szkoła Doktorska IPPT PAN nie prowadzi kształcenia w jej zakresie.

Since 2022 Institute of Fundamental Technological Research of the Polish Academy of Sciences does not have permission in the discipline “Automatics, electronics and electrotechnics”, which is why the Doctoral School of IPPT PAN does not provide education in its field.

RECRUITMENT AND ADMISSIONS TO THE DOCTORAL SCHOOL OF IPPT PAN

§1

1. Every candidate who has completed courses of higher education and holds an MSc, an MSc Eng. or another equivalent degree or a candidate referred to in art. 186 section 2 of the Act (pursuant to art. 200 section 1 of the Act) may apply for admission to the Doctoral School of IPPT PAN.

2. Enrolment at the Doctoral School of IPPT PAN is open to Polish citizens, citizens of other European Union Member States and the EEA states and to the citizens of other countries, according to the rules set out in other regulations.

§2

1. Admission to the Doctoral School of IPPT PAN is granted to the candidates who successfully completed the recruitment process, which involves a competition. The competition is designed to check whether the candidate demonstrates the required competence and interest in academic work, is well prepared for the study of the chosen discipline and has a command of the foreign language necessary for the chosen speciality. Recruitment of the candidates for the Doctoral School of IPPT PAN is carried out by the Recruitment Committee appointed by the Director of IPPT PAN.

2. Competition results are open and public. IPPT PAN ensures transparency of results by publishing the name of the candidate and information: ‘admitted’ or ‘not admitted’ on the IPPT PAN website and on the notice board in the IPPT PAN.

§3

Detailed information about recruitment requirements and the date of recruitment is openly published, especially on the IPPT PAN website.

§4

1. Candidates applying for admission to the Doctoral School of IPPT PAN who meet the requirements set out in §1, should submit the following documents to the Office of the Doctoral School of IPPT PAN:
1) application to the Director of IPPT PAN, specifying the field of research and the name of the proposed supervisor or supervisors or names of the proposed supervisor and the subsidiary supervisor, who should give their approval on the application form,
2) personal data form, as required by the Institute, and 3 photos,
3) information about study programmes and (scientific, teaching, professional) work completed by the candidate, in the form required by the Institute,
4) Curriculum Vitae,
5) transcript of a diploma of higher education (vocational college or equivalent courses of study) or other documents, pursuant to art. 186 section 2 of the Act.

§5

1. In order to be admitted to the Doctoral School of IPPT PAN, candidates must pass the following exams:
a) written exam in mathematics,
b) written exam in the main subject, corresponding to the discipline in which the candidate plans to carry out research,
c) written exam in English (which involves accurate and exact translation of a popular science text from Polish to English).

2. In justified cases and with approval from the Recruitment Committee and the Director of the Doctoral School of IPPT PAN, the candidate may additionally take an oral exam in the form of an

interview, which is supposed to check candidate's other qualifications necessary to realize the subject of the PhD programme. This form of recruitment may be offered to the candidates who will run scientific and research projects.

3. In justified cases and with approval from the Recruitment Committee and the Director of the Doctoral School of IPPT PAN, exams mentioned in sections 1-2 may be held using multimedia techniques. This applies in particular to disabled candidates or to those who are abroad on the day of exam.

§6

Each candidate is fully informed about their exam results.

§7

Candidates have access to sample exam papers used at the Doctoral School of IPPT PAN in previous years.

§8

Candidates are admitted to the Doctoral School of IPPT PAN by virtue of a decision taken by the Director of the Doctoral School of IPPT PAN on the basis of the documentation submitted by the Recruitment Committee.

§9

1. Candidates are admitted to the Doctoral School of IPPT PAN upon registration on the list of PhD Students.

2. Admission to the Doctoral School of IPPT PAN is refused through administrative decision. The decision is issued by the Director of IPPT PAN and may be appealed against within 14 days of receipt by the candidate submitting a formal request for reconsideration of the decision to the Director of IPPT PAN.

Warsaw, 28 March 2019

REGULATIONS OF THE DOCTORAL SCHOOOL OF IPPT PAN

adopted by a resolution of the Scientific Council of the IPPT PAN on March 28, 2019
including changes introduced by the resolutions of March 25, 2021 and of November 25. 2021.

I. GENERAL RULES

§1

The aim of the Doctoral School of IPPT PAN at the Institute of Fundamental Technical Research PAN (hereinafter referred to as the Institute) is to facilitate and accelerate the process of obtaining the PhD degree in the field of sciences and disciplines represented at the Institute. The study programmes offered by the Doctoral School of IPPT PAN follow the rules set out in the Act on Higher Education and Science dated 20 July 2018 (Polish Journal of Laws, item 1668), hereinafter referred as the Act, and the provisions of these Regulations.

§2

1. Study programmes are run by the Doctoral School of IPPT PAN in the form of full-time studies. They enable their participants (hereinafter referred to as PhD students) to acquire the knowledge and skills necessary to complete their study programmes and the final PhD thesis in the field of the chosen subject.

2. The Doctoral School of IPPT PAN is set up pursuant to the decision on the establishment of the Doctoral School of IPPT PAN issued by the Director of IPPT PAN at the request of the Scientific Council of IPPT PAN.

3. The duration of a PhD programme at the Doctoral School of IPPT PAN is 8 semesters. The programmes are realized in accordance with the Study Programmes at the Doctoral School of IPPT PAN.

4. The duration of Study Programmes at the Doctoral School of IPPT PAN may be extended, however by no longer than 2 years.

§3

The Doctoral School of IPPT PAN is run by the Director of the Doctoral School of IPPT PAN appointed by the Director of the Institute from among the employees of the IPPT PAN holding an academic title or a D.Sc. degree (*doktor habilitowany*).

§4

The teaching process at the Director of the Doctoral School is supervised by the Scientific Council of IPPT PAN to which the Director of the Doctoral School of IPPT PAN shall submit an annual report.

§5

The academic year commences on 1 October and ends on 30 September of the following calendar year. It is divided into two semesters: the first semester running from 1 October to the end of February and the second semester – from 1 March to 30 June. The period from 1 July to 30 September shall be devoted by PhD students of the Doctoral School of IPPT PAN to the activities set by the supervisor or supervisors or by the supervisor and the subsidiary supervisor.

§6

1. The candidates to the Doctoral School of IPPT PAN shall be recruited pursuant to the rules of recruitment and admissions to the Doctoral School of IPPT PAN.

2. The candidate admitted to the Doctoral School of IPPT PAN shall commence the PhD programme and acquire the rights of the PhD student upon taking the oath.

§7

A student can be a PhD student at one doctoral school at a time only.

§8

These Regulations shall be binding unless the generally applicable laws, including acts, statutes and regulations stipulate otherwise.

II. SUPERVISORS

§9

1. Within 3 months of the date of commencement of the study programme, the Director of IPPT PAN (in agreement with the chairman of the Scientific Council's Committee for Academic Staff Training or a representative designated by the chairman) shall appoint the PhD student's supervisor or supervisors or his/her supervisor and the subsidiary supervisor as well as indicate the scientific discipline or the field of science.

2. The decision mentioned in section 1 above is made on the basis of the following documents:
a) application submitted by the PhD student, including his/her proposal of the supervisor or supervisors or the supervisor and the subsidiary supervisor,
b) consent given by the supervisor or supervisors or the supervisor and the subsidiary supervisor to assume this function, including a declaration that they meet the requirements necessary to perform this function, as set out in art. 190 sections 4, 5 and 6 of the Act,
c) declaration issued by the PhD student, the supervisor or supervisors or by the supervisor and the subsidiary supervisor, including 1) the proposed subject of the PhD thesis and 2) specification of the scientific discipline or the field of science in which the PhD degree is to be conferred.

§10

The supervisor or supervisors or the supervisor and the subsidiary supervisor shall provide scientific guidance to the PhD student. In particular, they shall assist the PhD student in choosing the subject of the doctoral thesis aligned with the PhD student's interests and competences, and in preparing an individual research plan. The supervisor or supervisors or the supervisor and the subsidiary supervisor shall hold regular consultations with the PhD student, assist the PhD student with their scientific development, assess progress, help them prepare the results for publication and to include the results into the PhD thesis, monitor its progress and offer guidance in the choice and realization of the PhD student's individual research plan. The supervisor or supervisors or the supervisor and the subsidiary supervisor shall be responsible for the scientific level of the PhD thesis and for the level of its author's education.

§11

1. A decision to change the supervisor or supervisors or the supervisor and the subsidiary supervisor, as well as the scientific discipline or the field of science shall be made by the Scientific Council of IPPT PAN.

2. The decision mentioned in section 1 above is made on the basis of the documents listed in §9 section 2, and also on the basis of:

a) a written motivation for the change requested by the PhD student or by the supervisor or the subsidiary supervisor or by the Director of the Institute,
b) if the request is made after the individual research plan is prepared – an updated version of the PhD student's individual research plan.

3. The decision mentioned in section 1 shall be made on the basis of an analysis carried out by one of the following two bodies:
a) before the mid-term evaluation – by the Scientific Council's Committee for Academic Staff Training,
b) after the mid-term evaluation – by the Doctoral Committee, as defined in part IV below.
In particular, the Doctoral Committee shall decide to what extent the evaluation carried out by the Mid-Term Evaluation Commission should be applicable in the light of the updated version of the individual research plan.

4. The decision to change the supervisor shall be taken within the period of 100 days of the date of submission of the documents listed in section 2 above.

III. PROGRESS EVALUATION AND DOCUMENTING THE REALIZATION OF PHD STUDENT'S STUDY PROGRAMME AT THE DOCTORAL SCHOOL OF IPPT PAN DURING THE FIRST AND THE SECOND YEAR

§12

1. The Scientific Session of the first year PhD Students of the Doctoral School of IPPT PAN is held before the end of the first year of the PhD programme. It is organized by the Scientific Council's Committee for Academic Staff Training.

2. During the session, each first year PhD student at the Doctoral School of IPPT PAN shall hold a 10-15 min. seminar at which they will present their most important scientific achievements during the study programme at the Doctoral School of IPPT PAN. The seminar is open to the public and followed by question time.

3. Each PhD Student shall bring the following documents (hard copies) to the Scientific Session:
a) individual study plan,
b) description of his/her scientific and educational achievements in the first year at the Doctoral School of IPPT PAN, including a report on the realization of individual study programme (maximum one A4 page) and a preliminary version of the research plan referred to in §13.

4. The PhD Student's seminar, presented as part of the Scientific Session of the PhD Students, is attended by the Evaluation Committee appointed for each doctoral student by the Chairman of the Scientific Council at the request of the Chairman of the Scientific Council's Committee for Academic Staff Training, which includes:

a) at least 1 member of the Scientific Council's Committee for Academic Staff Training, appointed by the Chairman of this Committee, other than the persons mentioned in point d),

b) at least 1 representative of the PhD Student's scientific discipline, appointed by the Chairman of the Scientific Council's Committee for this discipline, other than the persons mentioned in point d),

c) Director of the Doctoral School of IPPT PAN,

d) the supervisor or supervisors or the supervisor and the subsidiary supervisor.

Among the persons mentioned in points a), b), c), there should be at least 2 persons representing the PhD Student's scientific discipline. When appointing the Evaluation Committee, the Chairman of the Scientific Council entrusts one of the persons mentioned in points a) and b) the function of its chairman.

5. Having attended the seminar, the Evaluation Committee shall assess the progress of the PhD Student in a closed meeting and put forward recommendations for their future scientific activity. They may also consider it necessary to make the proposed individual research plan more precise or to change it.

§13

1. Within 12 months of the date of commencement of their study programme, the PhD Student, in consultation with the supervisor or supervisors or with the supervisor and the subsidiary supervisor, shall prepare an individual research plan and submit it in writing to the Office of the Scientific Council of IPPT PAN, using the form defined in Appendix 1a (Polish language version) or 1b (English language version). The individual research plan should meet the requirements set out in the Act, and in particular, it should include a schedule for preparation of the PhD thesis and the date of its submission.

2. Each submitted individual research plan is submitted for the opinion to the relevant Evaluation Committee referred to in §12 sec.4.

3. The Evaluation Committee shall examine the individual research plans and, if reasonable, request their modification. A positive opinion of the Evaluation Committee is recorded on each submitted individual research plan.

4. Information about individual research plans is presented to the Scientific Council of IPPT PAN. Individual research plans are made available to members of the Scientific Council

IV. MID-TERM EVALUATION COMMISSION AND DOCTORAL COMMITTEE

§14

1. The Scientific Council appoints the Mid-Term Evaluation Commission and the Doctoral Committee to each PhD student individually, in accordance with the Act.

2. The Commission and the Committee shall be appointed by the end of the first half of the period of study programme at the Doctoral School of IPPT PAN.

3. The Mid-Term Evaluation Commission consists of three members, however, at least one of the members must work for a body other than the Institute and must not be employed by the Institute at the same time.

4. All the Mid-Term Evaluation Commission members hold a D.Sc. degree (*doktor habilitowany*) or the title of professor.

5. The Doctoral Committee consists of the minimum number of three members, including at least one member of the Scientific Council of IPPT PAN.

6. All members of the Mid-Term Evaluation Commission are also members of the Doctoral Committee.

7. The Standing Committee of the Scientific Council of IPPT PAN for the discipline of the PhD thesis submits its proposal for the composition of the Mid-Term Evaluation Commission and of the Doctoral Committee to the Scientific Council. If the doctoral thesis is prepared in a field of science with no discipline specified, the composition of both the Commission and the Committee is proposed by the Scientific Council's Committee for Academic Staff Training.

8. The persons who have been appointed to become members of the Commission and the Committee must express their consent to assume this function before the proposal is submitted to the Scientific Council of IPPT PAN.

§15

1. Should a PhD thesis cover scientific problems from more than one discipline, the supervisor, in agreement with the Scientific Council's Committee for Academic Staff Training and the other supervisors or the subsidiary supervisor, shall submit a written statement specifying the first and the second or the first, the second and the third discipline relevant for the subject of the PhD thesis.

2. In the case described in section 1 above, the Mid-Term Evaluation Commission shall be composed of members who conduct scientific research in the disciplines listed in the statement.

V. MID-TERM EVALUATION PROCEDURE

§16

1. Mid-term evaluation is held between the commencement of the twenty first and the end of the twenty fourth month of the PhD programme at the Doctoral School of IPPT PAN.

2. Mid-term evaluation is conducted by the Mid-Term Evaluation Commission, in accordance with the Act.

§17

Mid-term evaluation procedure has the following stages:

1. The PhD student submits to the Scientific Council his/her Curriculum Vitae (both hard and electronic copy), current individual research plan (including the names of the supervisor or supervisors or the subsidiary supervisor and the discipline in which he/she is planning to obtain the PhD degree), the supervisor's opinion, a list of scientific, teaching and organizational achievements (maximum one A4 page), including a list of the most important scientific publications and mention of these scientific achievements which will be part of the PhD thesis. The Scientific Council Office shall forward these documents to all the members of the Standing Commission specialized in a given discipline.

2. The doctoral student shall hold a 30-45 min. seminar at which he/she will present their current research results which will be part of the PhD thesis.

3. The seminar shall be attended by the Doctoral Committee members. It is necessary for all the members of the Mid-Term Evaluation Commission to attend the seminar. It is recommended for the supervisor or the supervisors or the supervisor and the subsidiary supervisor to attend the seminar. The seminar shall be open to the public.

4. The Doctoral Committee shall discuss the subject of the PhD thesis and the individual research plan with the PhD student but no other parties attending the discussion.

5. The Mid-Term Evaluation Commission, at a closed meeting and with no other persons present, shall evaluate the concept of the PhD thesis, the progress made by the student in their individual research plan and the scientific value of the achieved results. If appropriate, the Commission may put forward recommendations and conclusions for the PhD student and/or the supervisor to amend or correct the results submitted for evaluation.

6. The amended and corrected results should be submitted to the Commission within 3 months of the date the recommendations set out in section 5 above were issued by the Mid-Term Evaluation Commission. The amended and corrected results shall be assessed by the Mid-Term Evaluation Commission as described in sections 1 to 5 above.

7. During the first or the second (should the situation described in section 6 occur) closed meeting described in section 5, the Mid-Term Evaluation Commission shall decide in open voting whether the mid-term evaluation result is negative or positive, issuing relevant justification.

8. The Commission shall present the final mid-term evaluation result and its relevant justification to the Scientific Council and to the Director of the Doctoral School of IPPT PAN.

VI. DOCUMENTING THE REALIZATION OF PHD STUDENT'S STUDY PROGRAMME AFTER THE MID-TERM EVALUATION

§18

1. Having issued a positive mid-term evaluation result to the PhD Student, the Doctoral Committee continues to monitor the PhD student's progress in preparing their PhD thesis. Following the mid-term evaluation, the Doctoral Committee submits annual reports on the progress in the realization the individual research plan to the Scientific Council and the Doctoral School of IPPT PAN and issues guidelines and recommendations to the PhD Student.

2. Once the PhD thesis has been submitted to the Office of the Scientific Council of IPPT PAN, the Doctoral Committee members read it and prepare a report for the Scientific Council of IPPT PAN, including the proposed candidates for supervisors who meet relevant requirements set out in the Act.

3. The procedure for awarding the PhD degree to be followed upon submitting the PhD thesis and thereafter is set out in the Act, relevant regulations issued by the Ministry of Science and Higher Education as well as in the rules and regulations adopted by the Scientific Council and the Doctoral School of IPPT PAN.

§19

1. The Doctoral Student may request the Director of the Doctoral School of IPPT PAN to extend the study programme period at the Doctoral School of IPPT PAN and postpone the date of PhD thesis submission by a maximum period of 2 years. Such request must be made in writing and include a list of scientific and teaching achievements, a current individual research plan and a report on the realization of the individual study programme at the Doctoral School of IPPT PAN.

2. The decision to extend the period for the submission of the PhD thesis shall be made by the Director of the Doctoral School of IPPT PAN at the PhD student's request. However, the following requirements must be met:
1) positive opinion issued by the supervisor or the supervisors or by the supervisor and the subsidiary supervisor,
2) positive opinion issued by the Doctoral Committee.

3. The PhD Student may appeal against the decision of the Director of the Doctoral School of IPPT PAN to the Director of IPPT PAN.

VII. RIGHTS AND OBLIGATIONS, SCHOLARSHIPS

§20

1. The PhD Student shall conscientiously realize their individual study programme and individual research plan at the Doctoral School of IPPT PAN.

2. The PhD Student shall observe the provisions of these Regulations.

§21

1. The PhD Student who has not received a PhD degree yet, receives a doctoral scholarship. The doctoral scholarship is awarded by the Director of the Institute at the request of the Director of Doctoral School of IPPT PAN, for the period of 12 months.

2. Doctoral scholarships are paid out monthly in advance, starting from the first month following the month in which the student was admitted to the Doctoral School of IPPT PAN and has fulfilled formal requirements. The total period a doctoral scholarship is paid out at the Doctoral School of IPPT PAN shall not exceed 4 years. This period does not include the period of suspension or the period of study at the Doctoral School of IPPT PAN should the situation envisaged in art. 206 section 2 of the Act occur.

3. The monthly doctoral scholarship shall amount to a minimum of:
1) 37% of professor's remuneration – up to the month in which mid-term evaluation is performed;
2) 57% of professor's remuneration – after the month in which mid-term evaluation was performed.

4. Professor's remuneration, mentioned in section 3 above, is determined by the minister competent for higher education, in a relevant regulation.

5. The amount of doctoral scholarship may depend on the PhD Student's achievements.

6. When the study programme is suspended, the scholarship amount is determined pursuant to the provisions of law concerning the maternity allowance. However, the basis for calculation of the allowance shall be the amount of the monthly doctoral scholarship, mentioned in section 3 above, for which the student is entitled as of the date of his/her written request for the suspension of study programme.

7. The PhD Student holding a disability certificate or a certificate mentioned in art. 5 and art. 62 of the Act dated 27 August 1997 on professional and social rehabilitation and recruitment of the disabled, shall receive a doctoral scholarship in an amount by 30% higher than mentioned in section 3 clause 1 above.

8. The PhD Student who has submitted their PhD thesis before the date of study programme termination determined in their individual study programme, shall receive their doctoral scholarship until the date of study programme termination, however no longer than for the period of 6 months. The provision set out in section 2 shall apply.

9. The doctoral scholarship is also paid out in the period when a PhD Student is unable to carry out the study programme due to illness, providing care to a child or other sick family members or due to parental leave, for the period corresponding to the period social security benefits are paid out.

10. The PhD Student may not be employed on the post of academic teacher or research worker. This does not apply to students employed:
1) to work on a research project as defined in art. 119 section 2 clauses 2 and 3 of the Act;
2) after the mid-term evaluation completed with positive assessment result; however, in the case of more than half-time employment, the scholarship shall amount to 40% of the monthly scholarship, as defined in section 3 clause 2;
3) not entitled for the doctoral scholarship.

11. A PhD Student who has been expelled will also lose their doctoral scholarship. Doctoral scholarship shall cease to be paid out as of the first day of the month after the decision to expel the student was declared final.

§22

Doctoral scholarship at the Doctoral School of IPPT PAN may be funded or co-funded from a grant (a scientific research project). Such scholarship must also be of at least the minimum amount set out in the Act.

§23

1. Doctoral scholarship amount may be increased for a specified period in recognition of outstanding PhD Student's achievements, i.e. scientific activity and also organizational, teaching and science promotional activity in a given academic year.

2. At the end of the academic year, the PhD Student files an application to raise their doctoral scholarship due to outstanding achievements. Such an application must be endorsed by the supervisor or supervisors or by the supervisor and the subsidiary supervisor, and specify the PhD Student's achievements in the given academic year.

3. The application must obtain the opinion of the Scientific Council's Committee for Academic Staff Training (before the mid-term evaluation) or by the Doctoral Committee (after the mid-term evaluation).

§24

1. The Director of IPPT PAN may award the scholarship of the Director of IPPT PAN to PhD Students for their outstanding scientific, organizational, teaching and science promotional achievements in the previous academic year.

2. The scholarship of the Director of IPPT PAN is awarded to the PhD Student by increasing the amount of their current scholarship for a specified period.

3. The application to award the scholarship of the Director of IPPT PAN to a PhD Student is filed by the supervisor or supervisors or by the supervisor and the subsidiary supervisor, or by the head of the unit.

4. The scholarships of the Director of IPPT PAN are awarded to PhD students at a special session of the Scientific Council of IPPT PAN.

§25

Special scholarships for significant and outstanding achievements shall be awarded according to the regulations concerning the rise of scholarship amount for special achievements, prepared in agreement with the PhD Student Council and approved by the Scientific Council of IPPT PAN.

§26

The PhD Student of the Doctoral School of IPPT PAN is entitled to a holiday which does not exceed eight weeks during the year, which may be used during the period when teaching activities are not held or at a time agreed with their supervisor or supervisors or by the supervisor and the subsidiary supervisor. Holiday application shall be submitted by the PhD Student to the Office of the Doctoral School of IPPT PAN. The Office of the Doctoral School of IPPT PAN keeps record of the holiday taken by PhD Students.

§27

Should any controversies (e.g. problems having the requested holiday period approved by the supervisor or supervisors or by the supervisor and the subsidiary supervisor) arise, the PhD Student may seek assistance in settling the controversy with the Ombudsman or with the Director of the Doctoral School of IPPT PAN.

§28

1. Additional funding for the purpose of conferences or training necessary for the PhD Student to perform research under their individual study programme may be awarded at a reasonably motivated request, approved by the supervisor or supervisors or by the supervisor and the subsidiary supervisor.

2. The Director of IPPT PAN may award additional funding for organization of meetings or other scientific initiatives (such as symposia, PhD conferences) at a request made by the PhD Student and approved by the PhD Student Council and by the Director of the Doctoral School of IPPT PAN.

§29

PhD Students at the Doctoral School of IPPT PAN may establish their corporations, i.e. the PhD Student Council. The Council represents the interests of PhD Students at the Institute. The Council and the President of the PhD Student Council shall be appointed in accordance with the rules set out in the PhD Student Council Regulations.

VIII. FINAL PROVISIONS

§30

1. The PhD Student shall be expelled in the following situations:
1) negative mid-term evaluation result;
2) failure to submit their PhD thesis within the date determined in the individual research plan;
3) resignation by the student.

2.The PhD Student may be expelled in the following situations:
1) unsatisfactory progress in preparation of their PhD thesis;
2) failure to fulfil the obligations set out in art. 207 of the Act, in particular the obligation to realize the individual research plan and/or individual study plan defined pursuant to §1 of the Study Programme at the Doctoral School of IPPT PAN.

3. Decision to expel a PhD student shall be made by the Director of IPPT PAN in agreement with the Scientific Council's Committee for Academic Staff Training or with the Doctoral School.

4. A PhD Student shall be expelled following an administrative decision issued by the Director of IPPT PAN. The PhD Student may submit a request to reconsider this decision to the Director of IPPT PAN, within 14 days of the date of receipt of the decision.

§31

The rules governing remuneration of the scientific and research workers at the Polish Academy of Sciences who perform the function of the Director of the Doctoral School of IPPT PAN and those running lectures and classes at the Doctoral School of IPPT PAN shall be set out in other provisions of law.

§32

All matters which – pursuant to these Regulations – are decided by the Director of the Institute shall be dealt with through internal decisions of the Director of the Institute and communicated to whom they may concern. Organizational and administrative matters of the Doctoral School of IPPT PAN shall be dealt with in the same manner.

§33

Amendments to these Regulations shall be made in accordance with the Act.

§34

These Regulations shall enter into force on October 1, 2019.

INDIVIDUAL RESEARCH PLAN

The doctoral student, in consultation with the supervisor or supervisors, develops an individual research plan containing, in particular, a schedule for preparation of the doctoral dissertation and a deadline for submitting the doctoral dissertation. If an auxiliary supervisor is appointed, the plan is presented with an opinion of the auxiliary supervisor.
The doctoral student presents an individual research plan to the Scientific Council of IPPT PAN.
The document must be completed electronically.

1.Doctoral student	
Name and surname	
Affiliation	
Date of starting education at the doctoral school	
Field	
Discipline	

2.Dissertation supervisor	
Name and surname	
Affiliation	
Academic degree / title	
Field	
Discipline	

3. Data of the auxiliary supervisor (if designated)	
Name and surname	
Affiliation	
Academic degree / title	
Field	
Discipline	

4. Description of the research plan
(Topic of the doctoral dissertation, current state of knowledge in the field, research problem, goals, methodology, bibliography, planned scientific activities – no more than one page in total). The doctoral student may, in addition to the one-page description provided in this form, also attach its extended version.

5. Schedule for preparation of the doctoral dissertation with a deadline for its submission			
Planned stages of preparation of the doctoral dissertation (research tasks carried out as a part of the doctoral dissertation)			Dates
Year I	Semester I		
	Semester II		
Year II	Semester III		
	Semester IV		
Year III	Semester V		
	Semester VI		
Year IV	Semester VII		
	Semester VIII	Submission of the doctoral dissertation	

7. Opinion of the auxiliary supervisor (if designated)
My opinion about the individual research plan is positive.

.....
Date and signature of the auxiliary supervisor

8. Statement of the supervisor
The doctoral student developed the individual research plan in consultation with the supervisor (or supervisors). I approve this individual research plan.

.....
Date and signature of the dissertation supervisor

Submitted on .....

.....
Date, seal and signature of the Head of the Doctoral School

Opinion of the Evaluation Committee about the Individual Research Plan is positive.

……..

……..

……..
Names and signatures of the Evaluation Committee.

.....
Seal and signature of the President of the Scientific Council

INDYWIDUALNY PLAN BADAWCZY

Doktorant, w uzgodnieniu z promotorem lub promotorami, opracowuje indywidualny plan badawczy zawierający w szczególności harmonogram przygotowania rozprawy doktorskiej oraz termin złożenia rozprawy doktorskiej. W przypadku wyznaczenia promotora pomocniczego plan jest przedstawiany po zaopiniowaniu przez tego promotora.
Doktorant przedstawia indywidualny plan badawczy Radzie Naukowej IPPT PAN.

Dokument należy wypełnić elektronicznie.

1. Dane doktoranta	
Imię i nazwisko	
Afiliacja	
Data rozpoczęcia kształcenia w Szkole Doktorskiej IPPT PAN	
Dziedzina naukowa	
Dyscyplina naukowa	

2. Dane promotora	
Imię i nazwisko	
Afiliacja	
Stopień / tytuł naukowy	
Dziedzina naukowa	
Dyscyplina naukowa	

3. Dane promotora pomocniczego (jeśli wyznaczono)	
Imię i nazwisko	
Afiliacja	
Stopień / tytuł naukowy	
Dziedzina naukowa	
Dyscyplina naukowa	

4. Opis planu badawczego
(Temat rozprawy doktorskiej, aktualny stan wiedzy w tej tematyce, problem badawczy, cele, metodologia, bibliografia, planowana aktywność naukowa – nie więcej niż w sumie jedna strona). Doktorant może, obok jednostronicowego opisu przedstawionego w formularzu, załączyć także jego rozszerzoną wersję.

5. Harmonogram przygotowania rozprawy doktorskiej wraz z terminem jej złożenia			
Planowane etapy przygotowania rozprawy doktorskiej (zadania badawcze realizowane w ramach rozprawy doktorskiej)			Okres realizacji
Rok I	Semestr I		
	Semestr II		
Rok II	Semestr III		
	Semestr IV		
Rok III	Semestr V		
	Semestr VI		
Rok IV	Semestr VII		
	Semestr VIII	Złożenie rozprawy doktorskiej	

7. Opinia promotora pomocniczego, jeśli został wyznaczony
Opiniuję pozytywnie przedstawiony plan badawczy.

.....
Data i podpis promotora pomocniczego

8. Oświadczenie promotora
Indywidualny plan badawczy doktoranta został przygotowany w uzgodnieniu z promotorem/promotorami. Wyrażam zgodę na jego realizację.

.....
Data i podpis promotora/promotorów

Złożono w dniu .....

.....
Data i podpis Kierownika Szkoły Doktorskiej IPPT PAN

Komisja Oceniająca opiniuje pozytywnie Indywidualny Plan Badawczy.

.....

.....

.....
Nazwiska i podpisy członków Komisji Oceniającej

.....
Pieczęć i podpis Przewodniczącego Rady Naukowej IPPT PAN

Składy komisji są zmienne, co uzasadniono w opisie tego tematu.

The composition of the recruitment committees is variable, what has been substantiated in the description of this issue.

REGULATIONS OF THE DOCTORAL SCHOOOL OF IPPT PAN

adopted by a resolution of the Scientific Council of the IPPT PAN on March 28, 2019
including changes introduced by the resolutions of March 25, 2021 and of November 25. 2021.

I. GENERAL RULES

§1

The aim of the Doctoral School of IPPT PAN at the Institute of Fundamental Technical Research PAN (hereinafter referred to as the Institute) is to facilitate and accelerate the process of obtaining the PhD degree in the field of sciences and disciplines represented at the Institute. The study programmes offered by the Doctoral School of IPPT PAN follow the rules set out in the Act on Higher Education and Science dated 20 July 2018 (Polish Journal of Laws, item 1668), hereinafter referred as the Act, and the provisions of these Regulations.

§2

1. Study programmes are run by the Doctoral School of IPPT PAN in the form of full-time studies. They enable their participants (hereinafter referred to as PhD students) to acquire the knowledge and skills necessary to complete their study programmes and the final PhD thesis in the field of the chosen subject.

2. The Doctoral School of IPPT PAN is set up pursuant to the decision on the establishment of the Doctoral School of IPPT PAN issued by the Director of IPPT PAN at the request of the Scientific Council of IPPT PAN.

3. The duration of a PhD programme at the Doctoral School of IPPT PAN is 8 semesters. The programmes are realized in accordance with the Study Programmes at the Doctoral School of IPPT PAN.

4. The duration of Study Programmes at the Doctoral School of IPPT PAN may be extended, however by no longer than 2 years.

§3

The Doctoral School of IPPT PAN is run by the Director of the Doctoral School of IPPT PAN appointed by the Director of the Institute from among the employees of the IPPT PAN holding an academic title or a D.Sc. degree (*doktor habilitowany*).

§4

The teaching process at the Director of the Doctoral School is supervised by the Scientific Council of IPPT PAN to which the Director of the Doctoral School of IPPT PAN shall submit an annual report.

§5

The academic year commences on 1 October and ends on 30 September of the following calendar year. It is divided into two semesters: the first semester running from 1 October to the end of February and the second semester – from 1 March to 30 June. The period from 1 July to 30 September shall be devoted by PhD students of the Doctoral School of IPPT PAN to the activities set by the supervisor or supervisors or by the supervisor and the subsidiary supervisor.

§6

1. The candidates to the Doctoral School of IPPT PAN shall be recruited pursuant to the rules of recruitment and admissions to the Doctoral School of IPPT PAN.

2. The candidate admitted to the Doctoral School of IPPT PAN shall commence the PhD programme and acquire the rights of the PhD student upon taking the oath.

§7

A student can be a PhD student at one doctoral school at a time only.

§8

These Regulations shall be binding unless the generally applicable laws, including acts, statutes and regulations stipulate otherwise.

II. SUPERVISORS

§9

1. Within 3 months of the date of commencement of the study programme, the Director of IPPT PAN (in agreement with the chairman of the Scientific Council's Committee for Academic Staff Training or a representative designated by the chairman) shall appoint the PhD student's supervisor or supervisors or his/her supervisor and the subsidiary supervisor as well as indicate the scientific discipline or the field of science.

2. The decision mentioned in section 1 above is made on the basis of the following documents:
a) application submitted by the PhD student, including his/her proposal of the supervisor or supervisors or the supervisor and the subsidiary supervisor,
b) consent given by the supervisor or supervisors or the supervisor and the subsidiary supervisor to assume this function, including a declaration that they meet the requirements necessary to perform this function, as set out in art. 190 sections 4, 5 and 6 of the Act,
c) declaration issued by the PhD student, the supervisor or supervisors or by the supervisor and the subsidiary supervisor, including 1) the proposed subject of the PhD thesis and 2) specification of the scientific discipline or the field of science in which the PhD degree is to be conferred.

§10

The supervisor or supervisors or the supervisor and the subsidiary supervisor shall provide scientific guidance to the PhD student. In particular, they shall assist the PhD student in choosing the subject of the doctoral thesis aligned with the PhD student's interests and competences, and in preparing an individual research plan. The supervisor or supervisors or the supervisor and the subsidiary supervisor shall hold regular consultations with the PhD student, assist the PhD student with their scientific development, assess progress, help them prepare the results for publication and to include the results into the PhD thesis, monitor its progress and offer guidance in the choice and realization of the PhD student's individual research plan. The supervisor or supervisors or the supervisor and the subsidiary supervisor shall be responsible for the scientific level of the PhD thesis and for the level of its author's education.

§11

1. A decision to change the supervisor or supervisors or the supervisor and the subsidiary supervisor, as well as the scientific discipline or the field of science shall be made by the Scientific Council of IPPT PAN.

2. The decision mentioned in section 1 above is made on the basis of the documents listed in §9 section 2, and also on the basis of:

a) a written motivation for the change requested by the PhD student or by the supervisor or the subsidiary supervisor or by the Director of the Institute,
b) if the request is made after the individual research plan is prepared – an updated version of the PhD student's individual research plan.

3. The decision mentioned in section 1 shall be made on the basis of an analysis carried out by one of the following two bodies:
a) before the mid-term evaluation – by the Scientific Council's Committee for Academic Staff Training,
b) after the mid-term evaluation – by the Doctoral Committee, as defined in part IV below.
In particular, the Doctoral Committee shall decide to what extent the evaluation carried out by the Mid-Term Evaluation Commission should be applicable in the light of the updated version of the individual research plan.

4. The decision to change the supervisor shall be taken within the period of 100 days of the date of submission of the documents listed in section 2 above.

III. PROGRESS EVALUATION AND DOCUMENTING THE REALIZATION OF PHD STUDENT'S STUDY PROGRAMME AT THE DOCTORAL SCHOOL OF IPPT PAN DURING THE FIRST AND THE SECOND YEAR

§12

1. The Scientific Session of the first year PhD Students of the Doctoral School of IPPT PAN is held before the end of the first year of the PhD programme. It is organized by the Scientific Council's Committee for Academic Staff Training.

2. During the session, each first year PhD student at the Doctoral School of IPPT PAN shall hold a 10-15 min. seminar at which they will present their most important scientific achievements during the study programme at the Doctoral School of IPPT PAN. The seminar is open to the public and followed by question time.

3. Each PhD Student shall bring the following documents (hard copies) to the Scientific Session:
a) individual study plan,
b) description of his/her scientific and educational achievements in the first year at the Doctoral School of IPPT PAN, including a report on the realization of individual study programme (maximum one A4 page) and a preliminary version of the research plan referred to in §13.

4. The PhD Student's seminar, presented as part of the Scientific Session of the PhD Students, is attended by the Evaluation Committee appointed for each doctoral student by the Chairman of the Scientific Council at the request of the Chairman of the Scientific Council's Committee for Academic Staff Training, which includes:

a) at least 1 member of the Scientific Council's Committee for Academic Staff Training, appointed by the Chairman of this Committee, other than the persons mentioned in point d),

b) at least 1 representative of the PhD Student's scientific discipline, appointed by the Chairman of the Scientific Council's Committee for this discipline, other than the persons mentioned in point d),

c) Director of the Doctoral School of IPPT PAN,

d) the supervisor or supervisors or the supervisor and the subsidiary supervisor.

Among the persons mentioned in points a), b), c), there should be at least 2 persons representing the PhD Student's scientific discipline. When appointing the Evaluation Committee, the Chairman of the Scientific Council entrusts one of the persons mentioned in points a) and b) the function of its chairman.

5. Having attended the seminar, the Evaluation Committee shall assess the progress of the PhD Student in a closed meeting and put forward recommendations for their future scientific activity. They may also consider it necessary to make the proposed individual research plan more precise or to change it.

§13

1. Within 12 months of the date of commencement of their study programme, the PhD Student, in consultation with the supervisor or supervisors or with the supervisor and the subsidiary supervisor, shall prepare an individual research plan and submit it in writing to the Office of the Scientific Council of IPPT PAN, using the form defined in Appendix 1a (Polish language version) or 1b (English language version). The individual research plan should meet the requirements set out in the Act, and in particular, it should include a schedule for preparation of the PhD thesis and the date of its submission.

2. Each submitted individual research plan is submitted for the opinion to the relevant Evaluation Committee referred to in §12 sec.4.

3. The Evaluation Committee shall examine the individual research plans and, if reasonable, request their modification. A positive opinion of the Evaluation Committee is recorded on each submitted individual research plan.

4. Information about individual research plans is presented to the Scientific Council of IPPT PAN. Individual research plans are made available to members of the Scientific Council

IV. MID-TERM EVALUATION COMMISSION AND DOCTORAL COMMITTEE

§14

1. The Scientific Council appoints the Mid-Term Evaluation Commission and the Doctoral Committee to each PhD student individually, in accordance with the Act.

2. The Commission and the Committee shall be appointed by the end of the first half of the period of study programme at the Doctoral School of IPPT PAN.

3. The Mid-Term Evaluation Commission consists of three members, however, at least one of the members must work for a body other than the Institute and must not be employed by the Institute at the same time.

4. All the Mid-Term Evaluation Commission members hold a D.Sc. degree (*doktor habilitowany*) or the title of professor.

5. The Doctoral Committee consists of the minimum number of three members, including at least one member of the Scientific Council of IPPT PAN.

6. All members of the Mid-Term Evaluation Commission are also members of the Doctoral Committee.

7. The Standing Committee of the Scientific Council of IPPT PAN for the discipline of the PhD thesis submits its proposal for the composition of the Mid-Term Evaluation Commission and of the Doctoral Committee to the Scientific Council. If the doctoral thesis is prepared in a field of science with no discipline specified, the composition of both the Commission and the Committee is proposed by the Scientific Council's Committee for Academic Staff Training.

8. The persons who have been appointed to become members of the Commission and the Committee must express their consent to assume this function before the proposal is submitted to the Scientific Council of IPPT PAN.

§15

1. Should a PhD thesis cover scientific problems from more than one discipline, the supervisor, in agreement with the Scientific Council's Committee for Academic Staff Training and the other supervisors or the subsidiary supervisor, shall submit a written statement specifying the first and the second or the first, the second and the third discipline relevant for the subject of the PhD thesis.

2. In the case described in section 1 above, the Mid-Term Evaluation Commission shall be composed of members who conduct scientific research in the disciplines listed in the statement.

V. MID-TERM EVALUATION PROCEDURE

§16

1. Mid-term evaluation is held between the commencement of the twenty first and the end of the twenty fourth month of the PhD programme at the Doctoral School of IPPT PAN.

2. Mid-term evaluation is conducted by the Mid-Term Evaluation Commission, in accordance with the Act.

§17

Mid-term evaluation procedure has the following stages:

1. The PhD student submits to the Scientific Council his/her Curriculum Vitae (both hard and electronic copy), current individual research plan (including the names of the supervisor or supervisors or the subsidiary supervisor and the discipline in which he/she is planning to obtain the PhD degree), the supervisor's opinion, a list of scientific, teaching and organizational achievements (maximum one A4 page), including a list of the most important scientific publications and mention of these scientific achievements which will be part of the PhD thesis. The Scientific Council Office shall forward these documents to all the members of the Standing Commission specialized in a given discipline.

2. The doctoral student shall hold a 30-45 min. seminar at which he/she will present their current research results which will be part of the PhD thesis.

3. The seminar shall be attended by the Doctoral Committee members. It is necessary for all the members of the Mid-Term Evaluation Commission to attend the seminar. It is recommended for the supervisor or the supervisors or the supervisor and the subsidiary supervisor to attend the seminar. The seminar shall be open to the public.

4. The Doctoral Committee shall discuss the subject of the PhD thesis and the individual research plan with the PhD student but no other parties attending the discussion.

5. The Mid-Term Evaluation Commission, at a closed meeting and with no other persons present, shall evaluate the concept of the PhD thesis, the progress made by the student in their individual research plan and the scientific value of the achieved results. If appropriate, the Commission may put forward recommendations and conclusions for the PhD student and/or the supervisor to amend or correct the results submitted for evaluation.

6. The amended and corrected results should be submitted to the Commission within 3 months of the date the recommendations set out in section 5 above were issued by the Mid-Term Evaluation Commission. The amended and corrected results shall be assessed by the Mid-Term Evaluation Commission as described in sections 1 to 5 above.

7. During the first or the second (should the situation described in section 6 occur) closed meeting described in section 5, the Mid-Term Evaluation Commission shall decide in open voting whether the mid-term evaluation result is negative or positive, issuing relevant justification.

8. The Commission shall present the final mid-term evaluation result and its relevant justification to the Scientific Council and to the Director of the Doctoral School of IPPT PAN.

VI. DOCUMENTING THE REALIZATION OF PHD STUDENT'S STUDY PROGRAMME AFTER THE MID-TERM EVALUATION

§18

1. Having issued a positive mid-term evaluation result to the PhD Student, the Doctoral Committee continues to monitor the PhD student's progress in preparing their PhD thesis. Following the mid-term evaluation, the Doctoral Committee submits annual reports on the progress in the realization the individual research plan to the Scientific Council and the Doctoral School of IPPT PAN and issues guidelines and recommendations to the PhD Student.

2. Once the PhD thesis has been submitted to the Office of the Scientific Council of IPPT PAN, the Doctoral Committee members read it and prepare a report for the Scientific Council of IPPT PAN, including the proposed candidates for supervisors who meet relevant requirements set out in the Act.

3. The procedure for awarding the PhD degree to be followed upon submitting the PhD thesis and thereafter is set out in the Act, relevant regulations issued by the Ministry of Science and Higher Education as well as in the rules and regulations adopted by the Scientific Council and the Doctoral School of IPPT PAN.

§19

1. The Doctoral Student may request the Director of the Doctoral School of IPPT PAN to extend the study programme period at the Doctoral School of IPPT PAN and postpone the date of PhD thesis submission by a maximum period of 2 years. Such request must be made in writing and include a list of scientific and teaching achievements, a current individual research plan and a report on the realization of the individual study programme at the Doctoral School of IPPT PAN.

2. The decision to extend the period for the submission of the PhD thesis shall be made by the Director of the Doctoral School of IPPT PAN at the PhD student's request. However, the following requirements must be met:
1) positive opinion issued by the supervisor or the supervisors or by the supervisor and the subsidiary supervisor,
2) positive opinion issued by the Doctoral Committee.

3. The PhD Student may appeal against the decision of the Director of the Doctoral School of IPPT PAN to the Director of IPPT PAN.

VII. RIGHTS AND OBLIGATIONS, SCHOLARSHIPS

§20

1. The PhD Student shall conscientiously realize their individual study programme and individual research plan at the Doctoral School of IPPT PAN.

2. The PhD Student shall observe the provisions of these Regulations.

§21

1. The PhD Student who has not received a PhD degree yet, receives a doctoral scholarship. The doctoral scholarship is awarded by the Director of the Institute at the request of the Director of Doctoral School of IPPT PAN, for the period of 12 months.

2. Doctoral scholarships are paid out monthly in advance, starting from the first month following the month in which the student was admitted to the Doctoral School of IPPT PAN and has fulfilled formal requirements. The total period a doctoral scholarship is paid out at the Doctoral School of IPPT PAN shall not exceed 4 years. This period does not include the period of suspension or the period of study at the Doctoral School of IPPT PAN should the situation envisaged in art. 206 section 2 of the Act occur.

3. The monthly doctoral scholarship shall amount to a minimum of:
1) 37% of professor's remuneration – up to the month in which mid-term evaluation is performed;
2) 57% of professor's remuneration – after the month in which mid-term evaluation was performed.

4. Professor's remuneration, mentioned in section 3 above, is determined by the minister competent for higher education, in a relevant regulation.

5. The amount of doctoral scholarship may depend on the PhD Student's achievements.

6. When the study programme is suspended, the scholarship amount is determined pursuant to the provisions of law concerning the maternity allowance. However, the basis for calculation of the allowance shall be the amount of the monthly doctoral scholarship, mentioned in section 3 above, for which the student is entitled as of the date of his/her written request for the suspension of study programme.

7. The PhD Student holding a disability certificate or a certificate mentioned in art. 5 and art. 62 of the Act dated 27 August 1997 on professional and social rehabilitation and recruitment of the disabled, shall receive a doctoral scholarship in an amount by 30% higher than mentioned in section 3 clause 1 above.

8. The PhD Student who has submitted their PhD thesis before the date of study programme termination determined in their individual study programme, shall receive their doctoral scholarship until the date of study programme termination, however no longer than for the period of 6 months. The provision set out in section 2 shall apply.

9. The doctoral scholarship is also paid out in the period when a PhD Student is unable to carry out the study programme due to illness, providing care to a child or other sick family members or due to parental leave, for the period corresponding to the period social security benefits are paid out.

10. The PhD Student may not be employed on the post of academic teacher or research worker. This does not apply to students employed:
1) to work on a research project as defined in art. 119 section 2 clauses 2 and 3 of the Act;
2) after the mid-term evaluation completed with positive assessment result; however, in the case of more than half-time employment, the scholarship shall amount to 40% of the monthly scholarship, as defined in section 3 clause 2;
3) not entitled for the doctoral scholarship.

11. A PhD Student who has been expelled will also lose their doctoral scholarship. Doctoral scholarship shall cease to be paid out as of the first day of the month after the decision to expel the student was declared final.

§22

Doctoral scholarship at the Doctoral School of IPPT PAN may be funded or co-funded from a grant (a scientific research project). Such scholarship must also be of at least the minimum amount set out in the Act.

§23

1. Doctoral scholarship amount may be increased for a specified period in recognition of outstanding PhD Student's achievements, i.e. scientific activity and also organizational, teaching and science promotional activity in a given academic year.

2. At the end of the academic year, the PhD Student files an application to raise their doctoral scholarship due to outstanding achievements. Such an application must be endorsed by the supervisor or supervisors or by the supervisor and the subsidiary supervisor, and specify the PhD Student's achievements in the given academic year.

3. The application must obtain the opinion of the Scientific Council's Committee for Academic Staff Training (before the mid-term evaluation) or by the Doctoral Committee (after the mid-term evaluation).

§24

1. The Director of IPPT PAN may award the scholarship of the Director of IPPT PAN to PhD Students for their outstanding scientific, organizational, teaching and science promotional achievements in the previous academic year.

2. The scholarship of the Director of IPPT PAN is awarded to the PhD Student by increasing the amount of their current scholarship for a specified period.

3. The application to award the scholarship of the Director of IPPT PAN to a PhD Student is filed by the supervisor or supervisors or by the supervisor and the subsidiary supervisor, or by the head of the unit.

4. The scholarships of the Director of IPPT PAN are awarded to PhD students at a special session of the Scientific Council of IPPT PAN.

§25

Special scholarships for significant and outstanding achievements shall be awarded according to the regulations concerning the rise of scholarship amount for special achievements, prepared in agreement with the PhD Student Council and approved by the Scientific Council of IPPT PAN.

§26

The PhD Student of the Doctoral School of IPPT PAN is entitled to a holiday which does not exceed eight weeks during the year, which may be used during the period when teaching activities are not held or at a time agreed with their supervisor or supervisors or by the supervisor and the subsidiary supervisor. Holiday application shall be submitted by the PhD Student to the Office of the Doctoral School of IPPT PAN. The Office of the Doctoral School of IPPT PAN keeps record of the holiday taken by PhD Students.

§27

Should any controversies (e.g. problems having the requested holiday period approved by the supervisor or supervisors or by the supervisor and the subsidiary supervisor) arise, the PhD Student may seek assistance in settling the controversy with the Ombudsman or with the Director of the Doctoral School of IPPT PAN.

§28

1. Additional funding for the purpose of conferences or training necessary for the PhD Student to perform research under their individual study programme may be awarded at a reasonably motivated request, approved by the supervisor or supervisors or by the supervisor and the subsidiary supervisor.

2. The Director of IPPT PAN may award additional funding for organization of meetings or other scientific initiatives (such as symposia, PhD conferences) at a request made by the PhD Student and approved by the PhD Student Council and by the Director of the Doctoral School of IPPT PAN.

§29

PhD Students at the Doctoral School of IPPT PAN may establish their corporations, i.e. the PhD Student Council. The Council represents the interests of PhD Students at the Institute. The Council and the President of the PhD Student Council shall be appointed in accordance with the rules set out in the PhD Student Council Regulations.

VIII. FINAL PROVISIONS

§30

1. The PhD Student shall be expelled in the following situations:
1) negative mid-term evaluation result;
2) failure to submit their PhD thesis within the date determined in the individual research plan;
3) resignation by the student.

2.The PhD Student may be expelled in the following situations:
1) unsatisfactory progress in preparation of their PhD thesis;
2) failure to fulfil the obligations set out in art. 207 of the Act, in particular the obligation to realize the individual research plan and/or individual study plan defined pursuant to §1 of the Study Programme at the Doctoral School of IPPT PAN.

3. Decision to expel a PhD student shall be made by the Director of IPPT PAN in agreement with the Scientific Council's Committee for Academic Staff Training or with the Doctoral School.

4. A PhD Student shall be expelled following an administrative decision issued by the Director of IPPT PAN. The PhD Student may submit a request to reconsider this decision to the Director of IPPT PAN, within 14 days of the date of receipt of the decision.

§31

The rules governing remuneration of the scientific and research workers at the Polish Academy of Sciences who perform the function of the Director of the Doctoral School of IPPT PAN and those running lectures and classes at the Doctoral School of IPPT PAN shall be set out in other provisions of law.

§32

All matters which – pursuant to these Regulations – are decided by the Director of the Institute shall be dealt with through internal decisions of the Director of the Institute and communicated to whom they may concern. Organizational and administrative matters of the Doctoral School of IPPT PAN shall be dealt with in the same manner.

§33

Amendments to these Regulations shall be made in accordance with the Act.

§34

These Regulations shall enter into force on October 1, 2019.

INDIVIDUAL RESEARCH PLAN

The doctoral student, in consultation with the supervisor or supervisors, develops an individual research plan containing, in particular, a schedule for preparation of the doctoral dissertation and a deadline for submitting the doctoral dissertation. If an auxiliary supervisor is appointed, the plan is presented with an opinion of the auxiliary supervisor.
The doctoral student presents an individual research plan to the Scientific Council of IPPT PAN.
The document must be completed electronically.

1.Doctoral student	
Name and surname	
Affiliation	
Date of starting education at the doctoral school	
Field	
Discipline	

2.Dissertation supervisor	
Name and surname	
Affiliation	
Academic degree / title	
Field	
Discipline	

3. Data of the auxiliary supervisor (if designated)	
Name and surname	
Affiliation	
Academic degree / title	
Field	
Discipline	

4. Description of the research plan
(Topic of the doctoral dissertation, current state of knowledge in the field, research problem, goals, methodology, bibliography, planned scientific activities – no more than one page in total). The doctoral student may, in addition to the one-page description provided in this form, also attach its extended version.

5. Schedule for preparation of the doctoral dissertation with a deadline for its submission			
Planned stages of preparation of the doctoral dissertation (research tasks carried out as a part of the doctoral dissertation)			Dates
Year I	Semester I		
	Semester II		
Year II	Semester III		
	Semester IV		
Year III	Semester V		
	Semester VI		
Year IV	Semester VII		
	Semester VIII	Submission of the doctoral dissertation	

7. Opinion of the auxiliary supervisor (if designated)
My opinion about the individual research plan is positive.

.....
Date and signature of the auxiliary supervisor

8. Statement of the supervisor
The doctoral student developed the individual research plan in consultation with the supervisor (or supervisors). I approve this individual research plan.

.....
Date and signature of the dissertation supervisor

Submitted on .....

.....
Date, seal and signature of the Head of the Doctoral School

Opinion of the Evaluation Committee about the Individual Research Plan is positive.

……..

……..

……..
Names and signatures of the Evaluation Committee.

.....
Seal and signature of the President of the Scientific Council

INDYWIDUALNY PLAN BADAWCZY

Doktorant, w uzgodnieniu z promotorem lub promotorami, opracowuje indywidualny plan badawczy zawierający w szczególności harmonogram przygotowania rozprawy doktorskiej oraz termin złożenia rozprawy doktorskiej. W przypadku wyznaczenia promotora pomocniczego plan jest przedstawiany po zaopiniowaniu przez tego promotora.
Doktorant przedstawia indywidualny plan badawczy Radzie Naukowej IPPT PAN.

Dokument należy wypełnić elektronicznie.

1. Dane doktoranta	
Imię i nazwisko	
Afiliacja	
Data rozpoczęcia kształcenia w Szkole Doktorskiej IPPT PAN	
Dziedzina naukowa	
Dyscyplina naukowa	

2. Dane promotora	
Imię i nazwisko	
Afiliacja	
Stopień / tytuł naukowy	
Dziedzina naukowa	
Dyscyplina naukowa	

3. Dane promotora pomocniczego (jeśli wyznaczono)	
Imię i nazwisko	
Afiliacja	
Stopień / tytuł naukowy	
Dziedzina naukowa	
Dyscyplina naukowa	

4. Opis planu badawczego
(Temat rozprawy doktorskiej, aktualny stan wiedzy w tej tematyce, problem badawczy, cele, metodologia, bibliografia, planowana aktywność naukowa – nie więcej niż w sumie jedna strona). Doktorant może, obok jednostronicowego opisu przedstawionego w formularzu, załączyć także jego rozszerzoną wersję.

5. Harmonogram przygotowania rozprawy doktorskiej wraz z terminem jej złożenia			
Planowane etapy przygotowania rozprawy doktorskiej (zadania badawcze realizowane w ramach rozprawy doktorskiej)			Okres realizacji
Rok I	Semestr I		
	Semestr II		
Rok II	Semestr III		
	Semestr IV		
Rok III	Semestr V		
	Semestr VI		
Rok IV	Semestr VII		
	Semestr VIII	Złożenie rozprawy doktorskiej	

7. Opinia promotora pomocniczego, jeśli został wyznaczony
Opiniuję pozytywnie przedstawiony plan badawczy.

.....
Data i podpis promotora pomocniczego

8. Oświadczenie promotora
Indywidualny plan badawczy doktoranta został przygotowany w uzgodnieniu z promotorem/promotorami. Wyrażam zgodę na jego realizację.

.....
Data i podpis promotora/promotorów

Złożono w dniu .....

.....
Data i podpis Kierownika Szkoły Doktorskiej IPPT PAN

Komisja Oceniająca opiniuje pozytywnie Indywidualny Plan Badawczy.

.....

.....

.....
Nazwiska i podpisy członków Komisji Oceniającej

.....
Pieczęć i podpis Przewodniczącego Rady Naukowej IPPT PAN

PAN
POLSKA AKADEMIA NAUK

Prezes

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Pan
prof. dr hab. inż. Tadeusz Burczyński
Instytut Podstawowych
Problemów Techniki
Polskiej Akademii Nauk
w Warszawie

Na podstawie art. 53 ust. 3, 6 i 7 *ustawy z dnia 30 kwietnia 2010 roku o Polskiej Akademii Nauk* (Dz. U. z 2020 r. poz. 1796)

p o w o ł u j ę

Pana z dniem **1 grudnia 2021 roku** na Dyrektora Instytutu Podstawowych Problemów Techniki Polskiej Akademii Nauk w Warszawie, na okres czteroletniej kadencji, tj. do dnia **30 listopada 2025 roku**.

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