

Gdańsk University of Technology



Background and context

- Provide an overview of your institutions industrial PhD programme.
- Include funding sources, objectives, and key partnerships with industry.
- Describe the sectors and industries engaged with the programme.

Industrial doctorates, understood as doctoral degrees conducted in close collaboration with industrial partners can be realized in three ways:

- 1) in the Doctoral School (structured 4-year programmes),
- 2) in the Industrial Doctoral School (SDW) (structured 4-year programmes),
- 3) as an extracurricular activity (individual training outside of doctoral schools).

Ad 1. Doctoral School at Gdańsk University of Technology is a school with a general academic/scientific profile, run jointly with the Institute of Fluid-Flow Machinery, Polish Academy of Sciences in Gdańsk and the Institute of Hydro-Engineering, Polish Academy of Sciences in Gdańsk. Doctoral students cannot be academic staff members of the university at the same time.

Ad 2. The Industrial Doctoral School (SDW) is a school with a practical profile, offering doctoral training in cooperation with entrepreneurs or other entities employing PhD candidates, with the aim of implementing the results of the doctoral student's scientific activity in these entities. The

training at SDW is run in accordance with the Polish Ministry of Science and Higher Education (MNiSW) programme 'Implementation Doctorate'.

The program aims to create conditions for the development of cooperation between higher education and science entities with the socio-economic environment conducted within doctoral schools, involving the education of postgraduate students in collaboration with their employing entrepreneurs or other entities, the effect of which will be the implementation of the results of scientific activities conducted by doctoral students in these entities.

Doctoral students of SDW are full-time employees supervised jointly by a Gdańsk Tech academic and an advisor appointed by the industrial partner. Interested individuals apply to the SDW on a competitive basis. About 25-35 applications are submitted each year, out of which the Ministry approves 20-30.

Ad. 3. Apart from doctoral schools, another option for obtaining a doctoral degree is external study, which takes place at the request of the interested party outside the doctoral school. This mode of doctoral study is suitable for candidates who are scientifically independent and have skills related to conducting research or working at a university. Doctoral students may be, and often are, academic and teaching staff at universities. The second group of doctoral students consists of company employees who do not have time to attend an official doctoral school. They often conduct research related to their professional work.

For employees from outside the university, an external doctoral program is not free of charge. Its cost can range from several thousand to several tens of thousands of zlotys (several thousand euros).

Funding sources:

Ministry, subsidiary (ministry), MSCA, or other research projects, industry partners, and private funds.

Research within the doctoral thesis may be conducted in the following disciplines:

- Chemical Sciences,
- Physical Sciences,
- Mathematics,
- Civil Engineering, Geodesy and Transport,
- Architecture and Urban Planning,
- Environmental Engineering, Mining and Energy,
- Biomedical Engineering,
- Chemical Engineering,
- Materials Engineering,
- Mechanical Engineering,
- Automation, Electronics, Electrical Engineering and Space Technologies,
- Technical Informatics and Telecommunications,
- Economics and Finance,
- Management and Quality.

Sectors and industries engaged with the programme:

- architecture and urban planning
- automation
- electronics
- electrical engineering
- energy engineering
- geodesy
- mining
- applied computer science
- chemical engineering
- chemical sciences
- chemical and refinery industry
- civil engineering
- materials engineering
- mechanical engineering
- environmental engineering
- space technologies
- telecommunications
- transport
- management

Key characteristics

- Highlight distinctive features of your industrial doctorate programme.
- Address how collaboration with industrial partners is structured and supported (e.g. joint supervision, co-designed research projects, IP agreements).
- Explain funding models, including government support, industry sponsorship, or collaborative proposals.
- Describe logistical aspects like publication guidelines, and students' time allocation between academic and industrial settings.

The "Implementation Doctorate" program was established by the Minister of Science and Higher Education on 29 May 2019. The program aims to create conditions for the development of cooperation between higher education and science entities with the socio-economic environment conducted within doctoral schools, involving the education of postgraduate students in collaboration with their employing entrepreneurs or other entities, the effect of which will be the implementation of the results of scientific activities conducted by doctoral students in three entities:

1. "Implementation Doctorate I" supports the preparation of doctoral dissertations by doctoral students conducting scientific activities in areas other than those specified in points 2 and 3, the results of which may be applied in the activities of the entities.

2. "Implementation Doctorate II - artificial intelligence and quantum technologies" supports the preparation of doctoral dissertations by doctoral students conducting scientific activities on the

use of artificial intelligence and quantum technologies in technological or social processes, including those related to cybersecurity, the results of which may be applied in the activities of the entities employing the doctoral students.

3. "Implementation Doctorate III - metrology" supports the preparation of doctoral dissertations by doctoral students conducting scientific activities on the use of metrology in technological and social processes, including the development of digital technologies and the latest technologies in health, environment, energy, and advanced measurement techniques.

The objectives of education in the Industrial Doctoral School established at Gdańsk University of Technology are as follows:

- acquiring of professional qualifications of employees of socio-economic environments;
- increasing the competitiveness of units from the economic environment and stimulating engineering initiatives;
- strengthening the socio-economic environment - academic collaboration;
- facilitating independent scientific and research work, focused on acquiring the necessary qualifications and obtaining a doctoral degree;
- creating conditions for participation in the life of the scientific environment and for scientific cooperation in research teams, including on an international scale, through participation in internships in other research centers and scientific schools.

Funding and modalities

In the Industrial Doctoral School, PhD students receive ministerial scholarships (42%-64% of the salary of a professor) for up to 4 years in addition to their salary paid by the employer.

This stipend is tax-free but subject to social security contributions. Additionally, the university receives funding from the Ministry to support research infrastructure. These funds may be used for:

- purchasing or depreciation of research equipment,
- maintenance and repair of lab infrastructure,
- outsourcing analyses or research services,
- covering costs of specialist training or publication fees,
- participation in scientific conferences,
- overheads and administrative services.

PhD students of the Doctoral School are not employed and do not receive salaries. Scholarships are funded by the Ministry.

Modalities:

The program lasts 4 years (8 semesters) and combines academic education with industry-based research. Each PhD candidate is supervised by a scientific supervisor from the university, and an industrial mentor from the partnering company.

The curriculum is tailored for working professionals, with most courses delivered in a hybrid or weekend format, totaling approximately 150 hours throughout the programme.

Candidate Responsibilities include:

- developing and following of an Individual Research Plan,
- publishing scientific articles,

- participating in academic conferences,
- reporting on the progress on both scientific research and the implementation aspect.

Intellectual property rights

IP rights are governed by the Agreement on Cooperation in realization the “Implementation Doctorate” Program.

- The collaborating entity (company) acquires rights to all project outcomes (including inventions, utility models, industrial designs, know-how, etc.) created by the doctoral candidate, the industrial supervisor, or company employees under their employment contracts.
- The doctoral candidate retains proprietary copyright to their doctoral dissertation and related publications. These works are not considered "employee works" under Polish copyright law.
- The academic unit (Gdańsk Tech) acquires rights to project outcomes developed by the academic supervisor during the course of the project, except for scientific publications and academic works.
- If IP is co-created by the company (candidate or industrial supervisor) and the university (academic supervisor), ownership is shared proportionally to each party's creative contribution. The terms of use for such jointly owned IP must be defined in a separate agreement.
- Both parties are required to inform each other of any inventions, utility models, designs, works, databases, or know-how developed as part of the project.
- Results not subject to IP protection (e.g., data or findings) may be disseminated freely, including via publications or teaching activities.
- Transfer of IP rights between the company and the university may occur for fair market value and must be regulated in a separate agreement.

Support

Gdańsk University of Technology supports implementation-oriented doctoral studies through its units and programmes:

- Technology Transfer Centre (CTT) – supports the commercialisation of research, manages the results of scientific work, promotes innovation, and supports cooperation with business.
- Excento Sp. z o.o. – GDAŃSK TECH special-purpose vehicle supporting scientists and students in the commercialisation of research results and the implementation of ideas.
- ProtoLab – a 24/7 prototyping space with modern equipment (CNC, 3D, electronics), available to students and researchers.
- Innovation Incubator – helps to set up your own research-based business and establish cooperation with the business environment.
- Entrepreneurship Swallows – a competition for the best scientific and business project with the possibility of obtaining funding and substantive support.
- PATLIB Gdańsk – a patent information centre offering access to databases, patent analysis, IP consulting, and training in industrial property protection.

In addition, it is important to note that the Implementation Doctorate programme intends to be about research and its practical implementation, not to act as an academic teacher. This means that there is no teaching practice in the Implementation Doctoral School, i.e., an SDW doctoral student does not have to teach other students as an academic. Instead, however, you must provide proof of training min. 5 h as part of a training skills exercise. Such an assignment can be carried out as part of a work placement with your own employer or at the university under the supervision of a supervisor.

In the Industrial PhD programme at Gdańsk University of Technology, logistical arrangements are designed to balance academic rigor with industrial applicability, while accommodating the doctoral student's dual affiliation with the university and the partner company.

Time allocation is structured around full-time employment in the company, where the doctoral candidate conducts applied research. Simultaneously, the student is enrolled at the university, attending mandatory classes primarily during weekend sessions, often in hybrid or remote formats, to minimize disruption to professional responsibilities. The curriculum includes both scientific and interdisciplinary modules, and the student is also required to complete at least five hours of training to develop teaching or training skills, which can be fulfilled either at the company or the university under supervision.

Regarding publication guidelines, the programme acknowledges the need to protect confidential and commercially sensitive information developed during industrial collaboration. Therefore, while doctoral students retain full copyright to their dissertations and scientific publications, these outputs must comply with confidentiality provisions set out in the tripartite agreement. The company has the right to review and delay publication for a defined period to allow for patent applications or protection of trade secrets, but it cannot impose a permanent publication ban. This ensures that the doctoral candidate's academic freedom and the requirements for obtaining the doctoral degree, such as peer-reviewed publications, are preserved.

Key findings and outcomes could include

- Reporting on outcomes for institutions and industry partners.
- Exploring key features, successes, and challenges of institutional industrial PhD programmes from institutional and industry perspective.
- Providing evidence of the programme's impact on employability, skill development, and industry-academic collaboration.
- Identifying barriers related to legislation and funding (e.g. European Commission, Member States, universities).

Reporting on outcomes

At Gdańsk University of Technology, the reporting process for the Industrial PhD programme is clearly regulated through annual and final reporting obligations. Each participating institution,

acting as a programme beneficiary, is required to submit an annual report on the use of financial resources and on the doctoral candidate's progress by October 10 each year for the first three years of the project. Additionally, a final report must be submitted by October 31 of the final year. In the case of early termination of the doctoral candidate's participation—due to resignation, removal from the doctoral list, or the end of employment at the partner institution—a partial report is required within 30 days of such notification.

These reports must include detailed justifications of expenses related to the doctoral scholarship and research infrastructure as well as evaluations from both the academic and industrial supervisors concerning the candidate's performance. The industry partner (employer) is obliged to provide the necessary data for reporting, including confirmation of continued employment and the doctoral student's engagement in the project. Failure to submit complete or timely reports may result in immediate termination of the funding agreement by the Ministry of Science and Higher Education.

Key features, successes, and challenges

Key features:

- Tripartite model: university – doctoral student – company.
- Funding from the Ministry of Science and Higher Education: scholarship + funds for research infrastructure.
- The doctoral student is employed by the company, and the university organises weekend meetings (including online) to enable the student to combine work and study.
- IP regulated in a model agreement, distinguishing between original and acquired knowledge.

Successes:

- Intensification of cooperation between science and industry.
- Practical orientation of doctoral studies, possibility of implementation.
- Institutional support (CTT, Excento, ProtoLab, PATLIB).

Challenges:

- Rotation of industrial supervisors and communication problems.
- Risk of assigning tasks unrelated to the research project to the doctoral student.
- Lack of systematic preparation of academics for cooperation with industry.
- The university bears all financial risk in the event of project failure.

Evidence of the programme's impact

The Industrial PhD programme at Gdańsk University of Technology places strong emphasis on competence development, employment continuity, and fostering effective industry-academia collaboration. Doctoral candidates are required to complete compulsory modules covering intellectual property protection, research commercialisation, scientific methodology,

and soft skills. Additionally, they must conduct a minimum of five hours of training—typically at their place of employment—to develop teaching competencies.

A key feature of the programme is that the doctoral student must remain employed by the industry partner for the entire duration of the PhD. This structure ensures the relevance of research to real-world industrial challenges and encourages companies to invest in the development and implementation of innovative solutions. In many cases, companies intend to retain the doctoral candidate beyond the life of the project, strengthening long-term cooperation.

Collaboration between academia and industry takes the form of jointly executed research projects, shared access to infrastructure, and—where applicable—joint ownership of research outcomes. While companies may commercialise project results, the doctoral student's right to scientific authorship and publication is preserved, ensuring both academic integrity and applied impact.

Barriers

Formal and legal barriers:

- Lack of a unified European model for the implementation of the doctorate - the solution in Poland is based on the specific act and the Ministry communiqués.
- The requirement to employ a doctoral student in a company for the entire duration of the doctorate limits public sector participation.
- Lack of sanctions against companies that terminate contracts with PhD students - the university then bears the administrative and financial consequences.

Financial barriers:

- Ministry funding is capped and not subject to valorisation - universities cannot request an increase in funding.
- Funding ends on the date of submission of the dissertation, even if it takes less than 4 years.
- IP, commercialisation, or training costs may exceed the amount available from the programme.