

Proposed detailed actions aimed at achieving the goals of the Faculty Development Strategy for the years 2021-2025

AIM 1 STRONG RESEARCH TEAMS AND HIGH-LEVEL SCIENTIFIC RESEARCH

Action 1. Expansion of scientific collaboration among WIL employees and the creation of interdisciplinary research teams

- encouraging the formation of interdisciplinary Interdepartmental Research Teams (IRTs) within the Faculty focused around Research Innovation Leaders (RILs);
- recognizing and rewarding jointly undertaken scientific research activities;
- supporting the formation of teams within interfaculty and interuniversity consortia for grant implementation and scientific work;
- organizing departmental seminar-type meetings enabling the presentation of research conducted in individual units and facilitating the creation of research teams;
- limiting the teaching workload for the most scientifically active employees;
- establishing guidelines for the use of equipment resources by IRTs;
- ensuring that every employee from the "n-d" group and anyone interested in scientific work from the "d" group belongs to a small research team (2-5 individuals) working on the same topic.

Action 2. Intensification of activities aimed at securing external funding for research

- introduction of a "information about ongoing projects and current calls" point on RNWIL (Scientific Council of WIL) and dissemination of this information among WIL employees;
- Informing and encouraging employees to participate in training and workshops organized by CTT (Centre for Technology Transfer);
- assisting in the administrative preparation of applications and project management, as well as simplifying internal procedures related to application submissions;
- developing a motivational system for employees applying for external funding;
- initiating and entering into long-term framework agreements for cooperation with the business environment.

Action 3. Effective publication policy aimed at increasing the number of publications in journals on the MNISW list

- adding the responsibility of overseeing the research process and motivating publication efforts in MNISW-listed journals to the unit manager and RIL (Research Innovation Leader);
- linking employment and promotion policies to publication achievements;
- providing additional incentives for authors of MNISW-listed publications;
- encouraging collaboration among employees (comprehensive and team-based research);
- internationalization of research activities (see GOAL 2).

Action 4. Intensification of research collaboration with doctoral and master's students

- involving students in research activities as part of IRT (Interdepartmental Research Teams) initiatives;
- establishing workspaces for doctoral and master's students engaged in research within the units;
- increasing the number of students in the ILiT discipline in the Doctoral School;
- supporting the completion of doctoral theses through means other than the PK Doctoral School (e.g., doctoral candidates in projects, external doctoral candidates);
- engaging students and members of scientific circles in research activities.

Action 5. Increase activity related to patenting and commercializing research outcomes

- conduct periodic audits of the patenting potential of solutions developed within the units and organize departmental seminars on intellectual property protection and research commercialization;
- provide support to WIL employees involved in the research outcomes' commercialization process

Action 6. Creating small research teams

- Ensuring that every employee from the "n-d" group and anyone interested in scientific work from the "d" group belongs to a small research team (2-5 individuals) working on the same topic.

AIM 2 INTERNATIONALIZATION OF THE FACULTY AND STRENGTHENING ITS POSITION ON THE INTERNATIONAL STAGE

Action 1. Internationalization of the Faculty in terms of education

- increasing the number of international students at all degree levels;
- expanding the range of courses offered in English;
- promoting English-language programs at foreign universities;
- increasing the number of visiting professors at the Faculty with defined admission criteria;
- expanding the number of ERASMUS agreements;
- obtaining funding for the implementation of Action 1 (e.g., from NCBiR through the Knowledge Education Development Program, NAWA - Katamaran, NAWA - Foreign Promotion).

Action 2. Increasing the mobility of Faculty staff and their involvement in international organizations

- promoting and supporting the mobility of Faculty staff and doctoral students involved in scientific research;
- motivating staff to actively participate in international scientific and technical organizations such as RILEM (The International Union of Laboratories and Experts in Construction Materials, Systems, and Structures), FIB (The International Federation for Structural Concrete), ETSC (European Transport Safety Council), FGSV (Road and Transportation Research Association), and international research networks (e.g., COST action);
- increasing the mobility of Faculty staff through participation in NAWA (National Agency for Academic Exchange) and ERASMUS+ (European Educational Program) projects;
- striving to secure mobility projects funded by national and international sources (NAWA - Programs for institutions, Programs for scientists and doctoral students);
- increasing staff participation in internationally scoped conferences.

Action 3. Developing contacts with foreign research teams and supporting international cooperation

- supporting efforts to establish bilateral agreements;
- conducting joint research initiatives with scientists from foreign institutions;
- increasing the involvement of Faculty staff in the work of scientific and organizational committees of international conferences;
- supervising doctoral candidates from abroad and initiating dual degree programs with foreign universities (double diploma, cotutelle, codirection);
- updating unit websites in English and providing information on research competencies;
- creating consortia to secure international projects (Horizon Europe, H2020) and other international projects funded through NCBiR (bilateral and multilateral cooperation), NAWA (academic international partnerships), NCN (POLONEZ, BEETHOVEN Classic, DAINA, SHENG, CEUS, and others).

AIM 3 HIGH-QUALITY EDUCATION AND THE APPROPRIATE COMBINATION OF GRADUATE QUALIFICATIONS AND SKILLS WITH LABOR MARKET NEEDS

Action 0. Adapting education to new conditions arising from the pandemic situation

- developing tools and forms of distance learning;
- minimizing the negative impacts of remote learning.

Action 1. Close cooperation with the economy and organizations representing professional environments

- updating the content of vocational education to reflect changing engineering practices;
- enhancing the professional qualifications of academic staff;
- organizing regular lectures by specialists from the business community;
- increasing the role of professional internships with the assignment of ECTS points;
- developing lifelong learning programs tailored to current economic needs;
- organizing informational meetings and courses to prepare for obtaining construction qualifications.

Action 2. Implementation of elite education in civil engineering

- reducing the number of students and the number of teaching hours per academic staff member, and implementing more individualized teacher-student interactions;
- expanding scientific collaboration with the most talented students as part of their Individual Study Path;
- involving the best students in research and expert work carried out at the Faculty;
- activating scientific clubs and supporting student initiatives like FutureLab.

Action 3. Expansion of a laboratory base focused on effective and modern student education

- securing funds for the modernization and technical equipment of laboratory spaces;
- establishing "open" computer labs that allow students to work independently (preparing projects, assignments);
- supporting the expansion of the laboratory base to strengthen research in line with the Faculty's designated priorities;
- providing financial support for laboratory research conducted as part of diploma projects.

CEL 4 COLLABORATION WITH THE ENVIRONMENT AND STRENGTHENING THE FACULTY'S EXPERT CHARACTER

Action 1. Actively building relationships with industry and public institutions

- establishment of an Industry Collaboration Council;
- activation of actions by the Faculty's College regarding collaboration with industry;
- development of a database of economic entities, public institutions, and foreign organizations collaborating with the Faculty, along with the contact information of the responsible party;
- organization of Faculty events, conferences, and workshops involving industrial partners.

Action 2. Increasing the involvement of Faculty staff in carrying out scientific research for external entities

- engaging Faculty staff in conducting scientific research for academic institutions, business entities, government, and local government;
- expanding the scope of accredited research services and obtaining accreditation as a notifying and certifying body for research results;
- improving the competitiveness of services provided by the Faculty to the external environment;
- providing expert services with greater use of full-time resources (greater financial benefits for the Faculty).

Action 3. Collaboration with businesses in the context of doctoral work focused on solving applied problems

- promoting the idea of doctoral work focused on solving applied problems;
- establishing collaboration guidelines with businesses for "commissioned" doctoral work;
- defining the funding principles for research work carried out by doctoral students directed to the Faculty by the industry.

Action 4. Information campaign targeting potential partners to build the image of WIL as an expert entity

- promotion of scientific and applied achievements of the Faculty through seminars and conferences at the national and international level;
- exposure of offers on the Faculty and Department websites, in industry publications, using PK's telebim (digital billboard), and other communication channels;
- information campaign regarding services provided by the Faculty or its units;
- development of professional offers for expert services offered by the Faculty and its units;
- collaboration with the Krakow Technology Park and other units dedicated to the commercialization of scientific research results.

THE STRATEGY WILL BE SUBJECT TO MONITORING AT THE BEGINNING OF EACH CALENDAR YEAR.

RESPONSIBLE PARTIES:

UNIT HEADS FOR THE IMPLEMENTATION OF ESTABLISHED GOALS,

Dean for monitoring the WIL strategy.

PRIORITIES OF WIL SCIENTIFIC RESEARCH for the years 2021-2025

The main priorities of WIL scientific research are

- Climate-neutral, smog-free smart cities
- Modular construction and prefabrication
- Innovative materials and technological processes with a focus on the durability of engineering structures
- Energy-efficient construction,
- Sustainable development of transportation systems
- Research in the field of mechanics and computational methods.

Research activities at WIL are structured as follows

(L-1) Department of Reinforced and Prestressed Concrete Structures

- Advanced building materials and innovative technologies in the maintenance and revitalization of engineering structures
- Prefabrication in sustainable construction

(L-2) Department of Building Materials Engineering

- Durability of building materials
- Advanced functional materials (self-cleaning, self-repairing, anti-smog)
- Sustainable building materials with a reduced carbon footprint

(L-3) Department of Bridge, Metal, and Timber Structures

- Verification procedures for the limit states of steel and timber load-bearing structures based on probabilistic reasoning
- Prediction of the service life of used steel structures
- Assessment of the safety of structures in exceptional design situations
- Advanced dynamic analysis of bridge structures

(L-4) Department of General Construction and Building Physics

- Nearly zero-energy buildings and those with a positive energy balance
- Reduction of air pollution by smog in the city's atmosphere and inside buildings
- Revitalization of existing buildings, with a focus on large-panel buildings

(L-5) Department of Roads, Railways, and Traffic Engineering

- Reliable and safe transportation infrastructure
- Transportation safety
- Environmental protection in road and railway construction
- Innovative road and railway pavements

(L-6) Department of Transport Systems

- Sustainable development of transport systems
- Advanced simulation models of transportation processes
- Analysis of large datasets in transportation management

(L-7) Department of Construction Management

- Construction project management in terms of time and cost throughout the investment life cycle.

- Analysis of work efficiency, workforce planning, and schedule creation in construction execution
- Building Information Modelling (BIM) in management

(L-8) Department of Structural Mechanics and Materials

- Optimal design of building structures.
- Research on composite materials, carbon nanostructures, cellular materials.
- Protection of buildings and occupants from transportation and construction vibrations, including the protection of historic structures.
- Research on the impact of mining-induced vibrations on buildings and occupants, dynamic interaction under mining vibrations, the influence of vibration parameters on this phenomenon, and interaction models

(L-9) Department of Geotechnics and Material Strength

- Interaction of engineering structures with the subsoil - modern materials, technology, properties, durability, modification, and soil reinforcement
- Modelling of physical phenomena at the soil-foundation interface, stability, and bearing capacity
- Modern methods of strengthening and repairing engineering structures.

(L-10) Department of Information Technology in Engineering

- Modelling of materials and processes, including multiscale (digital material)
- Development of discretization methods and related software
- Applications of artificial intelligence methods in civil engineering

(L-12) Research Laboratory of Building Materials and Structures

- Research on railway and tramway surfaces with an application-oriented approach (Goal 4) in terms of static and dynamic effects,
- Testing the damping capabilities of mechanical shock absorbers (application-oriented actions with an industrial partner).

(L-13) Malopolskie Laboratory of Energy-Efficient Construction

- Energy-efficient construction
- Indoor microclimate
- Thermal modernization of historic buildings

(L-14) Wind Engineering Laboratory

- Dynamic research of engineering structures subjected to wind loads
- Dynamic ventilation of cities

(L-15) Laboratory for Deformation and Vibration Analysis of Structures

Protection of buildings and structures and the people within them from vibrations.

Monitoring systems for the protection of buildings from traffic and construction vibrations.

Research on ground vibrations from dynamic loads.

Research on the impact of vehicle passage speeds on vibration comfort in indoor spaces.