Development Strategy of the Faculty of Electrical and Computer Engineering for 2021-2025

The Faculty's strategy aligns with the Development Strategy of Cracow University of Technology, the OTM-R policy, and the University's internal regulations on personnel policy, including, among others, recruitment rules, periodic evaluations, and support for employees' academic career development.

1. MISSION

The mission of the Faculty of Electrical and Computer Engineering is to conduct high-level scientific research and to educate students at all levels of higher education and at the Doctoral School in close connection with the scientific and R&D work carried out in close cooperation with the socio-economic environment in Poland and abroad.

2. VISION

One of the top 5 best and friendliest faculties in Poland educating graduates at a very high level in the area of the disciplines of Automation, Electronics, Electrical Engineering and Space Technologies, Information and Communication Technology, and allowing the realization of scientific, teaching and organizational passions of its employees and students.

3. THE FACULTY'S STRATEGIC OBJECTIVES

1. Strengthening and improving research activities and obtaining at least category A in the next evaluation.
2. Developing new methods and forms of education and improving the conditions and quality of student education.
3. Efficient and effective management of the Faculty's resources.
4. Close cooperation with the socio-economic environment and the scientific community at home and abroad.
5. Sustainable and consistent development and building an image of a friendly Faculty and good intergenerational relations.

Objectives 1: Strengthening and improving research activities and obtaining at least the category A in the next evaluation.

- Close cooperation with the Centre for Research Excellence in forming interdisciplinary teams for research and jointly publishing high-scoring articles,
- Rapid upgrade of research laboratories and filling equipment shortages,
- Strengthening international cooperation by inviting visiting professors and post-doctoral fellowships,
- Promoting young scientists and providing good financial conditions, as well as relieving them of excessive teaching and organizational responsibilities,
- Introducing measures to encourage publication of scientific and research achievements in important scientific journals through allowances, bonuses, and awards in accordance with the Remuneration Regulations at CUT,

- Benefits for professors and assistant professors supervising doctoral students, including reduced teaching loads and bonuses for working with young faculty members,
- Introducing a system of rewards for outstanding research and teaching staff for the results they achieve,
- Dean's grants for young employees,
- Organizing employee information, suggesting that employees create profiles in important databases for researchers such as Publons, ResearchGate, etc.,
- Monitoring of scientific research results important for assessment in the evaluation process,
- Aiming at recruiting employees with high scientific potential from Poland and abroad who could significantly strengthen the scientific and research image of the Faculty,
- Including the most talented students and doctoral students in scientific research and preparing conditions for them to stay at the University,
- Analysis of evaluation rules, distribution of subsidies,
- Teaching load relief for top academics,
- Providing efficient administrative support for handling purchases in the implementation of grants, orders to industry, expertise,
- Developing procedures and rules to increase the effectiveness of receiving grants: NCN (National Science Centre), NCBiR (National Centre for Research and Development), the EU (European Union) or external funding.

Objective 2: Developing new methods and forms of education and improving the conditions and the quality of education for students

- Thorough modernization of teaching laboratories,
- Striving to improve the quality of education,
- Introducing a design approach into study programs,
- Proposing thesis topics in cooperation with employers,
- Improving and adapting the education process to the needs of employers,
- Increasing the base of potential placements and aiming to increase the number of potential placements for all students,
- Internship programs at companies,
- Internationalization of studies,
- Creating joint degree programs with foreign universities,
- Conducting the recruitment process in a balanced manner, taking into account human resources capabilities and funds received from the ministry,
- Increasing activities in the preparation of proposals for the purchase of equipment for modern teaching,
- Possibility for students to use the University's software,
- Creating visionary fields of study.

Objective 3: Efficient and effective management of the Faculty's resources

- Reorganization of the Faculty's structure and empowerment of the Departments,
- Improving and optimizing the flow of information at the Faculty,

- Introducing modern IT tools for the Faculty Administration, hiring a full-time IT specialist, building a computer network, and organizing information for the evaluation and operation of the Faculty,
- Assumption of organizational responsibilities of academic staff by administrative staff,
- A state-of-the-art class scheduling system with a mobile device interface linked to a room reservation system,
- A modern website and promotional efforts for the Faculty,
- Improving the student service system,
- Improving the management system at the Faculty,
- Interfaculty cooperation on joint purchases of software licenses (MATLAB, LabVIEW, etc.),
- Institutional assistance in preparing proposals and contracts for teaching and research projects.

Objective 4: Close cooperation with the socio-economic environment and the scientific community at home and abroad

- Developing a rich cooperation offer for the industry,
- Organizing and concluding cooperation agreements with key partners from the broader electricity, automation, and IT industries,
- Alumni ambassadors to promote the Faculty to their companies,
- Development of cooperation with industrial plants in the close economic environment, organization of meetings with entrepreneurs at the Faculty,
- Obtaining funds from the Ministry for implementation doctorates and building specialized laboratories for their implementation at the Faculty,
- Monitoring industry needs - formulating dedicated topics for scientific research work,
- Dissemination and promotion of R&D results,
- Supporting development work and helping to implement its results in the economy,
- Aiming to launch accredited laboratories and provide services externally,
- Establishing industrial consortia and jointly applying for NCBR and EU grants,
- Building demonstration stations of industry leaders in the Faculty's laboratories.

Objective 5: Sustainable and consistent development and building the image of a friendly Faculty and good intergenerational relations

- Adopting a long-term strategy for the development of the Faculty,
- Introduction of transparent financial policies,
- Maintaining a transparent faculty recruitment process based on the OTM-R Policy (Policy of Open, Transparent, Merit-Based Recruitment),
- Participation of student union representatives in collegial meetings concerning the development of the faculty,
- Supporting the Student Union at the Faculty,
- Launching Student Zones in the Faculty's building with the involvement of students in creating these places,
- Supporting and developing the student research clubs movement,

- Supporting student activities related to culture and sports,
- Conducting activities to strengthen ties and contacts with alumni,
- Establishment of the Faculty's Senior Convention for retired employees and empowerment of Senior Professors,
- The organization of educational activities for children and young people at the Faculty,
- Active participation in trade fairs, promotional exhibitions, Science Festival,
- Personnel appointments in the form of discussions with all employees of the Faculty, and in particular with the Faculty's Scientific Council.

4. MAIN AREAS OF RESEARCH

Department of Automation and Computer Science E-1

- Analysis, modeling and synthesis of complex computer systems with a higher degree of reliability, their testing, verification and validation,
- Grid computing, cloud and fog computing, Internet of Things, and data centers,
- Interdisciplinary scientific and research work at the intersection of automation, computer science, electrical engineering, mechanics, and metrology,
- Optimal control and systems diagnostics, advanced computing and artificial intelligence, building automation, magneto fluids applications, sensor and data acquisition systems.

Department of Electrical Engineering E-2

- Methods of circuit and field modeling of electrical machinery and equipment, analysis of magnetic materials properties,
- Monitoring and diagnostics of electrical machinery and equipment,
- Power generation and conversion systems for RES (hydropower, photovoltaics), power quality monitoring and optimization, monitoring and diagnostics of distributed systems, electric power protection technology,
- Power electronics and mechatronic systems, electromobility and electric vehicle drives, electromagnetic compatibility,
- Rapid prototyping, 3D printing and scanning methods in mechatronics.

Department of Infotronics and Cybersecurity E-3

• Identification of automation systems,
• Digital control,
• 3D printing,
• Building automation,
• Artificial Intelligence,
• Cybersecurity and safety of critical and key OT infrastructure
• Mechatronic systems, electromobility and industrial system drives.

5. LINKING THE FACULTY TO SCIENTIFIC DISCIPLINES

The faculty represents the discipline: **automatics, electronics, electrical engineering and space technology**. Faculty members also support the discipline of information and communication technology and other disciplines.

Within the framework of interdisciplinary cooperation through the Centre for Research Excellence, the employees participate in the development of other disciplines represented by CUT faculties.

6. PRIORITY DEVELOPMENT DIRECTIONS AND ASPIRATIONS OF THE FACULTY

- Continuing to upgrade laboratory facilities,
- Expanding cooperation with industry,
- Introducing the Project Based Learning approach into study programs,
- Proceeding with the construction of laboratories at CePTE's Environmental Technology Centre,
- Launching studies in English,
- Expanding international cooperation,
- **The Faculty is aiming for at least the category A the next evaluation.**

7. SPECIFIC ACTIVITIES OF THE FACULTY AIMED AT ACHIEVING THE GOALS ENSHRINED IN THE STRATEGY OF DEVELOPMENT OF CRACOW UNIVERSITY OF TECHNOLOGY FOR 2021-2025 IN ACCORDANCE WITH THE APPENDIX TO SENATE RESOLUTION NO. 55/O/06/2021 DATED JUNE 23, 2021.

Activities relating to faculties and their implementation at the Faculty of Electrical and Computer Engineering:

I.1.2. b) Increasing the effectiveness of the organization of student internships - concluding agreements on the organization of internships

- Signing contracts with cooperating companies.
- Appointment of the dean's representative for student internships.
- Additional student internships and placements branded by the Faculty.
- Having a target of sufficient number of internship places for each student.
- Long-term internships in companies for possibly all faculty students.

I.1.2. c) business entities taking patronage over majors

- Patronage of majors by companies - market leaders.
- Aiming to secure patronage for majors from several companies.

I.1.2. d) conducting "practical" classes for students by industry representatives (possibly as part of elective subjects)

- Selected specialized subjects taught by industry practitioners,
- Practical classes organized at the enterprise,
- Modification of subjects within the framework of the POWER project - "Programming excellence - CUT XXI 2.0. Development Program for Cracow University of Technology for 2018-22" and others.

I.1.2. f) Organization of classes and training study tours to partner specialized companies and institutions (preparing/proposing subjects as possible)

- Numerous study tours as part of classes,
- Technical tours to industry trade shows,
- During the pandemic, online training by partner companies.

I.1.2. h) Introduction of new majors, diploma profiles, postgraduate studies, ordered courses to the offer of The Faculty

- Infotronics - a new second-cycle program, unique on a national and European scale,
- Automation in Industry 4.0 - a new specialization in the Electronic and Automation second-cycle program
- Matching specializations to current market needs,
- Inviting company representatives to the Program Councils of the majors.

I.1.4. c) Establishment of so-called "open laboratories" for students, common spaces for students'/doctoral students' own work

- Providing students with access to teaching or research laboratories, if possible.

I.1.5. b) Developing interdisciplinary and individual student/doctoral training pathways in cooperation with external entities

- Implementation of implementation doctorates,
- Implementation of interdisciplinary projects by student research clubs,
- Collaboration with FutureLab,
- Cooperation with external entities.

I.3.3. a) Adaptation of the didactic offer of bachelor's and master's degrees in English to the requirements of the domestic and foreign markets

- In 2022, it is planned to declare an offer of studies in English in the second-cycle program of the new specialization Control, Monitoring and Diagnostics of Electrical Systems.

I.4.2. c) Acquisition of international accreditation and KAUT accreditation by CUT faculties

- PKA Accreditation,
- After PKA accreditation, an application will be submitted for KAUT accreditation for the Electrical and Automation Engineering major.

I.4.3. a) Improving the delivery of education using distance learning methods and techniques (materials in the "cloud")

- Widespread use of remote working tools,
- New innovative materials under the POWER project,
- Additional teaching materials on the implementation of equipment laboratories (videos, photos, presentations, etc.)

I.4.3. b) introduction of uniform rules for teaching the same subjects by different lecturers

- Establishing precise guidelines for all forms of teaching and formalizing them in the form of a communication from the dean,
- Constant monitoring of the implementation of the teaching process,
- Cooperation with the Faculty Council of Student Union,
- Meetings with students at least once a semester,
- Encouraging students to contact and complete surveys,
- Improving procedures for improving the quality of education.

I.4.3. f) Creation and updating of teaching offerings (subject database) to be conducted remotely by university employees for the benefit of other entities and ongoing updating of data

- Individual actions of individuals in the departments,
- Conclusion of cooperation agreements with Kraków's technical vocational high schools,
- Preparation of educational offerings for high schools,
- Specialized training for other entities.

II.1.2 Increasing the number of publications in top scientific journals

- Paying activity bonuses for publications in high-scoring journals,
- Interdisciplinary collaborative publications of CDBN,
- Maintaining high activity bonuses for publications.

II.1.3. Increasing the number of research projects financed from national and European sources

- Establishment of an organizational unit in the structure of the Faculty's administration: Project Service and Foreign Cooperation Team,
- Continuously motivating employees to submit project proposals,
- Entering into consortiums with entrepreneurs for the purpose of submitting project proposals (NCBR, Horizon),
- Activity bonuses for raising funds above PLN 50,000.

II.1.4. b) Increasing participation of visiting professors and their research teams in interdisciplinary work

- Developing and improving the procedure for inviting visiting professors, as well as the procedures for contracting and allocating funds between the Faculty and its departments,
- Inviting visiting professors every year.

II.2.1. a) Supporting the organization of international conferences including with partner universities (which enable the creation of special issues of international journals - high rates) and seminars

- Involvement in the organization of international conferences,

- Participation in NAWA (Polish National Agency for Academic Exchange) and other research and science dissemination projects.

II.2.2. g) Development of a system of financial support for research and research and teaching staff for expanding foreign cooperation (including reimbursement of their stay in foreign academic and research units and for establishing cooperation)

- A case-by-case approach to supporting employee initiatives,
- Establishing cooperation with foreign partners.

III.2.1. k) Organization of competitions for teaching activities

- Competition for the Faculty's best teacher,
- Award ceremony at the Electrician's Ball.

IV.2.2. Establishing new contacts with scientific and commercial entities and maintaining permanent contacts with entities with which the CUT cooperates

- Entering into framework cooperation agreements with companies,
- Entering into agreements with foreign universities,
- Entering into agreements with foreign entities.

III.4.2. b) Implementation of infrastructure expansion in accordance with the plans

- Proceeding with the construction of CePTE,
- Modernization of faculty laboratories,
- Construction of a low-current installation throughout the Faculty's building,
- Implementation of the smoke removal project in the Faculty's building,
- Renovation and furnishing of staff rooms,
- Improving the image of corridors and stairwells.

IV.1.2. Developing a database of expert/specialist areas based on the achievements of active CUT researchers and the areas they deal with – a system at the spokesperson's office to maintain a coherent image

- Collaboration with the CUT Spokesperson's Office and engaging several experts to work together,
- Increasing the activity of faculty members in the media and social networks.

IV.2.4. Undertaking research and implementation work that, in partnership with other academic centers from around the world, the business sector, public administration, and non-governmental organizations, can contribute to solving important societal problems

- Close and continuous national and international cooperation,
- International projects under Horizon Europe,
- Increasing the number of contracts with industry.