

METHODOLOGY

# Engi rank

NEXT GENERATION EUROPEAN RANKING  
OF ENGINEERING PROGRAMS

2023

Ranking Organizers

**Perspektywy**

Perspektywy Education Foundation

**f r s e**

Foundation for the Development  
of the Education System

Ranking Partner



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Scientists study the world  
as it is,  
engineers create the world  
that never has been

Theodore von Kármán



# European Ranking of Engineering Programs 2023

*Project executed by*

**Perspektywy Education Foundation (Poland)**

*in partnership with*

**Foundation for the Development of the Education System FRSE  
(Poland's National Agency for the Erasmus+ Programme  
and the European Solidarity Corps)**

*and supporting partner*

**Elsevier**

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## Why EngiRank?



**Waldemar Siwinski**  
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*We are proud to present the first edition of the European Engineering Studies Ranking EngiRank, to its name we added the phrase NEXT GENERATION. Each of these words is important and requires further explanation. Why is a new Ranking needed? Why is it European? Why does it apply to Engineering Studies? And why did we feel it was appropriate to use the words NEXT GENERATION?*

*According to the analysis by IREG Observatory on Academic Ranking and Excellence, at least 100 solid university rankings are published every year; these are - international, regional, national, disciplinary (by subject), impact rankings, business school rankings and others. At the same time, we observe a growing number of opinions critical of rankings, especially the global rankings of the Big-4 group (THE, QS, USNews, ARWU). Why then, are we proposing a new ranking?*

*The answer is, in short: because it is needed. Students of technical faculties need it when planning to study or go for an internship abroad, European companies need it as well as the international academy. EngiRank is a voice in the discourse on the future of European industry and, indirectly, of international rankings. We are convinced that their future belongs to regional rankings "by subject".*

*Just a few years ago, it seemed that globalization, including scientific cooperation and academic exchange, would have no borders. The volcanic eruption in Iceland, ongoing global climate changes, then the pandemic and the war in Ukraine painfully showed us that something had come to an end when it comes to an optimistic approach to the future... The argument that global rankings will help someone choose studies in any country in the world loses its appeal. To think a high school graduate from Azerbaijan will considering study in Argentina – it's absurd. We have learned the hard way what long "supply chains" can mean, and why it is important to ensure that in critical situations these chains are as short as possible and as European as possible.*

*Our ranking is European, it covers 27 European Union member states (therefore it does not include Great Britain, Switzerland, and Norway). Therefore, it was possible to construct a ranking relying on indicators unique for the EU countries, based, among others, on university's participation in the Erasmus+ and Horizon programs. Evaluating universities in countries with similar legal systems, similar cultural origins, universities that take part in joint research programs (European Research Council) and academic cooperation initiatives (consortiums of European universities) guarantees a much better presentation of their strengths and weaknesses than while relying on such defective indicator as student-to-faculty ratio.*

*All European countries need top-class engineers, this is a need of utmost urgency! Only in the IT area in Europe there is a shortage of almost 2 million engineers... Globalization has indeed taken a turn for the worse, but global technological competition has not slowed down, in this field those count who run faster. Engineering education plays a key role in ensuring the sustainable development of Europe, it is essential in creating innovative technologies and educating creative engineers who can use science to solve problems, but who also are aware of the social consequences of their actions. To meet these challenges in the era of internationalization of industry and labor market, best practices in engineering education need to be identified and promoted. This is what EngiRank is for. It's publication has been preceded by several years of consultations and seminars with representatives of the European industry.*

*And finally, why NEXT GENERATION, or what is innovative about EngiRank?*

**First:** *the combination of the regional ranking with the "by subject" ranking is innovative. There already are some regional rankings – but they are to more than "extracts" from the overall THE or QS rankings*

**“ The future  
 of international  
 rankings belongs  
 to regional rankings  
 "by subject" ”**



- there are also global rankings in disciplines, in the case of QS and THE they rely again on a limited set of data collected for the main rankings. To use data in individual disciplines on a regional basis, and in relation to universities operating in a specific region, has not yet been done! EngiRank inaugurates this new, forward-looking approach.

**Po drugie:** Po raz pierwszy publikujemy ranking, w którym główny nacisk położony został na podrankingi „by subject”. Publikujemy ich siedem, wszystkie dotyczą obszaru „Engineering & Technology”. Jakość tych rankingów „by subjects” składa się na kryterium „Interdyscyplinarność” (“interdisciplinarity”), które z wysoką wagą 21 procent uwzględniamy w rankingu uczelni. Przyjęto, że aby uczelnia mogła być uwzględniona w EngiRank Institutional musi zaistnieć co najmniej w trzech rankingach „by subject”.

**Second:** For the first time, we are publishing a ranking with emphasis on "by subject". We are publishing seven of them, all related to the "Engineering & Technology". The quality of these "by subjects" rankings constitute the "interdisciplinarity" criterion, which is included in the institutional university ranking with a high weight of 21 percent. A university to be included in the institutional EngiRank, it had to appear in at least three "by subject" rankings.

**Third:** EngiRank is a PRO BONO ranking, it has not been made to make money but with public benefit in mind. Critics of global rankings focus on allegations that universities are "forced" to scrupulously collect data, data that ranking organizations then "privatize", and include in packages sold to universities. EngiRank, however, uses only external data (exogenous) and does not offer any related database services. We are principled in this matter, in line with the mission of the Perspektywy Educational Foundation, which is a not-for-profit organization, with a 25 years' tradition.

**Four:** Due to the goals of EngiRank and its strictly defined area of education and research, the ranking focuses on criteria and indicators related to relations between academia and industry. Five indicators try to capture and highlight universities that not only conduct research but are able to do it in cooperation with the industry, and to effectively implement the results in Hi Tech companies. This approach has never been seen in the rankings before!

**Five:** Into the ranking we introduced a dynamic citation impact change index (FWCI), a novelty in academic rankings. Instead of considering only the static state of citations in the four-year period immediately preceding the publication of the ranking, we refer to the result in the preceding four-year period, which gives an opportunity to distinguish universities that have made the greatest progress in research.

**Six:** A pioneering in the world of rankings is the inclusion in the "by subject" rankings, with a significant weight of 10 percent, accreditations of engineering programs by the ENAEE (European Network for Accreditation of Engineering Education). This clearly demonstrates the advantages of a regional approach to rankings!

**Seven:** EngiRank is published in absolute transparency, in the best possible form. Each ranking user has access to all indicators and can independently check the correctness of calculations. There also is a procedure for quick fixing errors should such be reported after the ranking publication.

Finally, let me emphasize that this ranking would not happen without the personal involvement of **Prof. Paweł Poszytek**, the general director of the Foundation for the Development of the Education System FRSE (the National Agency of the Erasmus Plus Program and the National Agency of the European Solidarity Corps in Poland). We thank him for all his support and trust.

I extend special thanks to **M'hammed Aisati**, global vice president of Elsevier, and Tomasz Psonka, regional director of Elsevier for Central and Eastern Europe.

All ranking results - including options for convenient sorting by universities, countries, disciplines, criteria and indicators - will be available on the EngiRank website [www.engirank.eu](http://www.engirank.eu)

Comments and suggestions regarding EngiRank 2023 will be used when preparing the next edition of the ranking next year.

**Waldemar Siwiński**



## Assumptions

Engineering education plays a key role in securing sustainable development of Europe, it is vital in creating innovative technologies and educating creative engineers capable of using science to solve problems but also aware of the social consequences of their actions. To meet these challenges in the age of growing development of the industry, labor market and education, we need a tool to compare the quality of engineering and technology programs offered by the European universities. Rankings of universities and programs have become accepted form of comparing and assessment understood by a broad range of stakeholders.

The European Rankings of Engineering Programmes *EngiRank* fills a gap regarding current and trustworthy information on engineering education, as well as research and innovation, in European universities and other higher education institutions (HEIs) with strong technical profile.

Our primary concern in designing *EngiRank* was the highest reliability of the rankings. The geographical scope of *EngiRank* covers all 27 member countries of the European Union. One of the reasons for this coverage of the rankings is related to the right of EU citizens to study in other member states under the same conditions as nationals; the exercise of this right is additionally supported by the Erasmus+ mobility programmes. Intensified student mobility brings about demands for information on the quality of European HEIs. Furthermore, consortia of institutions from various member states can apply for research and innovation funding to the Horizon Europe programmes and the recently launched European Universities initiative develops long-term cooperation between the European HEIs. These actions level the playing field for HEIs within the European Union and make comparing those institutions more meaningful.

Another factor considered essential for the *EngiRank* credibility is the quality and reliability of data. The rankings are based only on trustworthy external databases containing information on European HEIs that is collected in a unified way, such as the bibliometric database Scopus, EPO Worldwide Patent Statistical Database (PATSTAT), information on participations in the European Commission's initiatives (Community Research and Development Information Service – CORDIS, information on mobilities within Erasmus+ programmes, participation in the European universities alliances), databases of programmes accredited by quality assurance agencies. No information necessary to compile the rankings were obtained directly from HEIs.

The *EngiRank* has been initiated and prepared by the Warsaw based "Perspektywy" Education Foundation. The main partner of the project is the Foundation for the Development of the Education System – FRSE (Poland's national agency for the Erasmus + Program and the European Solidarity Corps). Its supporting partner is Elsevier. The *EngiRank* is primarily addressed to the following groups:

- **Prospective students and their parents** – it will help in choosing a field of study and institution in Europe that, after graduation, will give best chances of finding a satisfactory job. It will also be helpful in study abroad and finding internship under the Erasmus + program,
- **Employers, including European Hi Tech industry** – will help in looking for talented graduates of technology institutions,
- **University management** – ranking will help monitor reforms and improve the quality of teaching.

## Methodology

*EngiRank* Board decided to reduce diversification of HEIs included in the rankings in order to avoid comparing unmatchable institutions and increase relevance of the rankings.

### Entry requirements

**The ENTRY CRITERIA for institutional ranking include a qualitative condition:**

- The institutions considered to be classified in the *EngiRank* had been checked against the European Engineering Education Database (EEED) run by ENGINEERS EUROPE, a federation of professional engineering associations from European Higher Education Area (EHEA) countries;

**and quantitative conditions:**

- The HEIs with a significant share of research output in engineering and technology – at least 30% of publications from last 5 years (2018-2022) that are indexed in the Scopus database – were examined. However, the institutions with majority of publications in medical and health sciences or in social sciences between 2018 and 2022 were not considered as HEIs with strong technical profile and they are not listed in *EngiRank*;

The **institutional ranking** within *EngiRank* includes HEIs which are classified in at least three subject rankings.

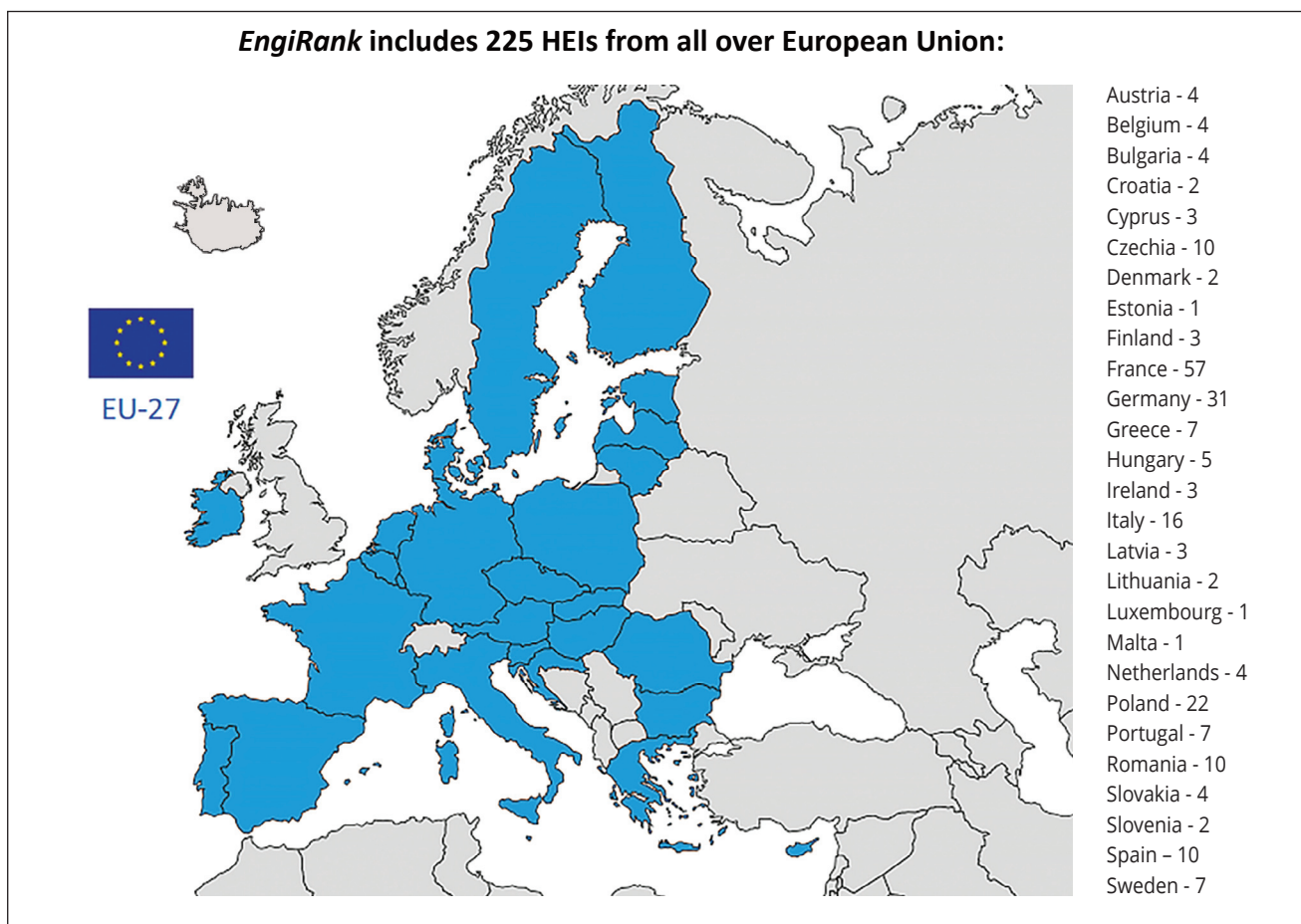
The **subject ranking** satisfying the qualitative condition and both quantitative conditions: share of publications in engineering and technology not less than 30% and a number of publications in a discipline not less than a threshold value.

- The threshold numbers of publications in main engineering disciplines from the last 5 full years that are indexed in the Scopus database are as follows:
  - chemical engineering – 200
  - civil engineering – 100
  - electrical engineering, electronic engineering, information engineering – 200
  - environmental engineering – 100
  - materials engineering – 250
  - mechanical engineering – 200
  - medical engineering – 100.

The classification of disciplines adopted in *EngiRank* corresponds to the OECD Fields of Research and Development (FORD), both on the level of 1-digit major fields (i.e. 2. Engineering and technology, 3. Medical and health sciences, 5. Social sciences) and on the level of 2-digit categories (2.1 Civil engineering; 2.2 Electrical engineering, electronic engineering, information engineering etc.).

Only in exceptional cases, in order to include leading engineering-profile HEIs from all EU27 countries in the *EngiRank* institutional ranking, the threshold of E&T publications share was lowered (and if outcomes of two leading institutions were very close, we decided to include both of them in the rankings). That applies to Ireland, Croatia, Malta and Flanders.





## Innovative approach

Our particular concern in designing *EngiRank* was the degree of the institutions' commitment to their economic and social missions. To reflect transfer and application of academic knowledge by HEIs we included the indicators measuring collaboration between academia and industry researchers, use of research output in successful patent applications, as well the very patent activity of HEIs, students internships and contribution to sustainable development goals – where appropriate – into the rankings.

*EngiRank* is a composition of different categories of indicators. We believe that the scale of institution's activities matters: research and innovation exhibits increasing returns to scale, and the larger the magnitude of HEI's operations, the more opportunities for students and academic staff. Thus indicators of size, measuring volume of research output, amount of research and innovation funding, number of patents or number of publications assigned to the selected sustainable development goals, play an important role in the rankings.

Inclusion of the subject rankings scores into the institutional ranking reflects returns to scope and benefits of interdisciplinarity.

Then we have the conventional efficiency indicators expressed in relative terms, such as citations per publication, share of publication in the top 10% journals, number of patent citations received on average by a publication, percentage of publications that are co-authored by industry researchers or foreign researchers. Introducing a dynamic indicator, change in citation impact, is a kind of novelty in the universe of HEIs' rankings.

Last, we included qualitative indicators representing engineering degree programmes accreditations and membership in a European university alliance. These indicators are closely related to the European Higher Education Area (EHEA) and clearly illustrate the advantages of a regional approach to academic rankings.

## EngiRank INSTITUTIONAL

The institutional ranking encompasses five criteria composed of 20 indicators. The most important criteria, according to their weights, are **Research** (28%) and **Innovation** (27%) – together they constitute 55% of the ranking. The third criterion, Contribution to **SDG 9**, recognizes institution's effort to make headway toward the sustainable development goal 9 - the weight of this single indicator criterion is 5%. The next criterion is **Internationalisation**, with the weight equal to 19%, and the last one is **Interdisciplinarity** (weight of 21%), that links the institutional ranking with the subject rankings.

### RESEARCH (28%)

The criterion composed of four indicators originating from the Scopus bibliometric database. **Publications** is the indicator representing the institution's research output in absolute terms. Then **Citations** and **Publications in Top 10% Journals** are indicators expressed in relative terms. The last one, **Change of Impact**, is a dynamic indicator that reflects a change in the citation impact. More detailed information on each indicator is given below.

- **Publications (PUB):** number of publications from the years 2018-2022 in the field Engineering and technology (FORD classification) in the Scopus database which are affiliated with the institution. *Source: Scopus/SciVal (10%)*
- **Publications in Top 10% Journals (TOP-10):** percentage of the institution's publications published in the top 10% journals by CiteScore in the field Engineering and technology in the years 2018-2022. *Source: Scopus/SciVal (6%)*
- **Citations (CIT):** ratio of the number of citations received by the institution's publications from the years 2018-2022 in the field Engineering and technology indexed in the Scopus database to the number of these publications. *Source: Scopus/SciVal (6%)*
- **Change of Impact (FWCI-C):** dynamic indicator calculated as the ratio of field-weighted citation impact (FWCI) for the institution's publications from the years 2018-2022 to FWCI for the publications from the years 2013-2017 in the field Engineering and technology. *Source: Scopus/SciVal (6%)*

### INNOVATION (27%)

The criterion composed of four indicators. First, **Research and Innovation Funding** and **Patents** are expressed in absolute terms and refer to the European frameworks of research and innovation funding and patent granting, respectively. The Scopus bibliographic database was the source for calculating the remaining two indicators: **Patent-Citation Count per Scholarly Output** and **Academic-Corporate Collaboration**. Both are expressed in relative terms. More detailed information on the indicators is given below.

- **Research and Innovation Funding (FUND):** value of grants awarded to the institution within the EU framework programmes funding research and innovation between 2018 and 2022. *Source: CORDIS (10%)*
- **Patents (PAT):** number of patents granted to the institution by the European Patent Office in 2018-2022. *Source: EPO-PATSTAT (6%)*
- **Patent-Citation Count per Scholarly Output (PCIT):** average number of patent citations received per scholarly outputs published by the institution in the field *Engineering and technology* in 2018-2022. *Source: Scopus/SciVal (6%)*
- **Academic-Corporate Collaboration (ACC):** percentage of publications the field *Engineering and technology* published between 2018 and 2022 that are co-authored by researchers affiliated to an institution outside academia. *Source: Scopus/SciVal (5%)*

#### PATSTAT

The European Patent Office's Worldwide Patent Statistical Database – PATSTAT is the most prominent patent database that has become a standard in the field of patent intelligence and statistics. The PATSTAT product line consists of two individual databases:

- **PATSTAT Global**, containing bibliographical data relating to more than 100 million patent documents from leading industrialised and developing countries,
- **PATSTAT EP Register**, containing bibliographic and legal event data on published European and Euro-PCT patent applications.

The databases are available as a bulk data set or via PATSTAT Online, which is a web-based interface. PATSTAT Online allows to run queries in the databases, conduct statistical analyses, visualise the data and download it for offline use.

## CONTRIBUTON TO SDG (5%)

The single indicator criterion. The indicator measures institution's contribution to sustainable development goal 9 with the number of publications assigned to SDG 9 and to the field *Engineering and technology*.

- **SDG-9:** number of publications from 2018-2022 assigned simultaneously to the United Nations *Sustainable Development Goal 9: Industry, innovation and infrastructure* and to the field *Engineering and technology* (FORD classification). *Source: Scopus/SciVal (5%)*

## INTERNATIONALISATION (19%)

The criterion composed of five indicators. The **International Collaboration** indicator is derived from the Scopus bibliographic database. The remaining indicators refer to the scale of students' mobility within the Erasmus+ programme and to the institution's participation in a European university alliance. More detailed information on each indicator is given below.

- **International Collaboration (IC):** percentage of the institution's publications in the field *Engineering and technology* in the years 2018-2022 that have co-authors from multiple countries. *Source: Scopus/SciVal (10%)*
- **Outbound student mobility (SMO):** number of institution's students undertaking studies abroad within the Erasmus+ programme in 2018-2020. *Source: Erasmus+ (2%)*
- **Inbound student mobility (SMI):** number of foreign students undertaking studies in the institution within the Erasmus+ programme in 2018-2020. *Source: Erasmus+ (2%)*
- **Student internships (SIN):** number of institution's students undertaking internships abroad within the Erasmus+ programme in 2018-202. *Source: Erasmus+ (1%)*
- **Partnership in a European university alliance (EUNI):** binary indicator showing whether the university is a full member of any European university alliance as of 3.07.2023. *Source: Erasmus+ (4%)*

### European Universities

The **European Universities alliances** are a flagship initiative of the European strategy for universities. European Universities develop and implement an integrated long-term joint strategy for education with, where possible, links to research and innovation, for the benefit of their students, staff and society. Beyond cooperation between higher education institutions, European Universities alliances foster collaboration with other partners, including civil society, and local and regional authorities with the aim to bring education and innovation closer together through joint activities. Currently, there are 50 European Universities alliances, involving more than 430 higher education institutions.

## INTERDISCIPLINARITY (21%)

This criterion identifies universities conducting high-level research in many fields of engineering and technology, which makes it easier for them to create future-oriented, interdisciplinary programs for the High-Tech industry. The criterion combines institutional rankings with subject rankings and rewards institutions classified in a larger number of disciplines and obtaining higher scores in these rankings. Seven "by subject" rankings are taken into account.

- **Chemical Engineering (CHE):** scores received in CHE subject ranking. *Source: EngiRank by subject (3%)*
- **Civil Engineering (CIV):** scores received in CIV subject ranking. *Source: EngiRank by subject (3%)*
- **Electrical engineering, Electronic engineering, Information engineering (EEI):** scores received in EEI subject ranking. *Source: EngiRank by subject (3%)*
- **Environmental Engineering (ENV):** scores received in ENV subject ranking. *Source: EngiRank by subject (3%)*
- **Materials Engineering (MAT):** scores received in MAT subject ranking. *Source: EngiRank by subject (3%)*
- **Mechanical Engineering (MEC):** scores received in MEC subject ranking. *Source: EngiRank by subject (3%)*
- **Medical Engineering (MED):** scores received in MED subject ranking. *Source: EngiRank by subject (3%)*.

## EngiRank BY SUBJECT

The *EngiRank* rankings in the following disciplines:

- Chemical Engineering
- Electrical Engineering, Electronic Engineering, Information engineering
- Materials Engineering
- Mechanical Engineering

are based on three criteria: Research (64%), Innovation (26%) and Teaching Quality (10%).

Then we addressed the potential and expected contribution of HEIs' activities in the remaining disciplines to the particular sustainable development goals (SDGs):

- Civil Engineering – SDG 11: Sustainable cities and communities
- Environmental Engineering – SDG 6: Clean water and sanitation
- Medical Engineering – SDG 3: Good health and well-being.

Thus the additional criterion, **Contribution to SDGs** (5%), was added for each of the above disciplines, and simultaneously the weights of other criteria were cut: **Research** - to 60%, and **Innovation** - to 25%.

Every indicator in the subject rankings refers strictly to a given discipline. Some indicators in the institutional ranking and in the rankings by subject are based on the same metrics, differing only in the scope of publications or grants considered. Although such indicators from the rankings by subject are indirectly included in the institutional ranking (via the *Interdisciplinarity* criterion) that shouldn't be considered a duplication of the indicators. Note that some HEIs are not classified in all the subject rankings in particular, approximately only half of HEIs listed in the institutional ranking are classified in the medical engineering ranking).

Besides, even in case of HEIs classified in all the rankings by subject there are publications and grants not covered by the subject rankings indicators, like the ones in general engineering; nuclear energy and engineering; control and systems engineering; safety, risk, reliability and quality; media technology; bioengineering; other miscellaneous engineering. They are counted in the institutional ranking only.

### RESEARCH (60%/64%)

- **Publications (PUB):** number of publications from the years 2018-2022 in the relevant discipline in the Scopus database which are affiliated with the institution. *Source: Scopus/SciVal (15%/16%)*
- **Publications in Top 10% Journals (TOP-10):** percentage of the institution's publications published in the top 10% journals by CiteScore in the relevant discipline in the years 2018-2022. *Source: Scopus/SciVal (15%/16%)*
- **Citations (CIT):** ratio of the number of citations received by the institution's publications from the years 2018-2022 in the relevant discipline indexed in the Scopus database to the number of these publications. *Source: Scopus/SciVal (15%/16%)*
- **Change of Impact (FWCI-C):** dynamic indicator calculated as the ratio of field-weighted citation impact (FWCI) for the institution's publications from the years 2018-2022 to FWCI for the publications from the years 2013-2017 in the relevant discipline. *Source: Scopus/SciVal (15%/16%)*

## CONTRIBUTION TO SDGs (0%/5%)

The single indicator criterion. The indicator measures institution's contribution to selected SDGs in defined disciplines by the number of publications.

- **SDG-3: Good health and well-being** (*medical engineering only*): number of publications from 2018-2022 assigned simultaneously to the United Nations Sustainable Development Goal 3: Good health and well-being and to medical engineering (FORD category 2.6). *Source: Scopus/Scival (5%)*
- **SDG-6: Clean water and sanitation** (*environmental engineering only*): number of publications from 2018-2022 assigned simultaneously to the United Nations Sustainable Development Goal 6: Clean water and sanitation and to environmental engineering (FORD category 2.7). *Source: Scopus/Scival (5%)*
- **SDG-11: Sustainable cities and communities** (*civil engineering only*): number of publications from 2018-2022 assigned simultaneously to the United Nations Sustainable Development Goal 11: Sustainable cities and communities and to civil engineering (FORD category 2.1). *Source: Scopus/Scival (5%)*


### SDGs

The **Sustainable Development Goals (SDGs)** are a collection of seventeen interlinked objectives adopted in 2015 by the 193 countries of the United Nations General Assembly (UNGA) as a part of the 2030 Development Agenda titled "Transforming our world: the 2030 Agenda for Sustainable Development." The SDGs emphasize the interconnected environmental, social and economic aspects of sustainable development by putting sustainability at their center and serve as a "shared blueprint for peace and prosperity for people and the planet, now and into the future." The UNGA resolution of 6 July 2017 identified 8-12 specific targets for each goal and provided between one and four indicators used to measure progress toward reaching each target.

The *EngiRank* recognises the potential and expected contribution of HEIs with strong technical profile to achieving SDG 9: Industry, innovation and infrastructure. Similarly, activities of HEIs in certain engineering and technology disciplines can support implementation of particular SDGs:

- **Civil Engineering - SDG 11:** Sustainable cities and communities,
- **Environmental Engineering - SDG 6:** Clean water and sanitation,
- **Medical Engineering - SDG 3:** Good health and well-being.

The indicators' weights in particular subject rankings are summarised in the table below.

	RESEARCH				INNOVATION		TEACH	SDG		
	Publications	Publications in Top 10% Journals	Citations	Change of Impact	Academic-Corporate Collaboration	Research and Innovation Funding	Accreditations	SDG 3: Good health and well-being	SDG 6: Clean water and sanitation	SDG 11: Sustainable cities and communities
Chemical Engineering	16%	16%	16%	16%	16%	10%	10%	-	-	-
Civil Engineering	15%	15%	15%	15%	15%	10%	10%	-	-	5%
Electrical, Electronic and Information Engineering	16%	16%	16%	16%	16%	10%	10%	-	-	-
Environmental Engineering	15%	15%	15%	15%	15%	10%	10%	-	5%	-
Materials Engineering	16%	16%	16%	16%	16%	10%	10%	-	-	-
Mechanical Engineering	16%	16%	16%	16%	16%	10%	10%	-	-	-
Medical Engineering	15%	15%	15%	15%	15%	10%	10%	5%	-	-



## TEACHING QUALITY (10%)

The single indicator criterion. The indicator is measured by the number of the degree programmes accredited by ENAEE authorised agencies or by ABET (more information on ENAEE and ABET in the frame)

- **Accreditations (ACCR):** number of engineering degree programmes related to the relevant discipline accredited by the agency authorized by the European Network for Accreditation of Engineering Education (ENAEE) or by the Accreditation Board for Engineering and Technology (ABET) as of 30.06.2023. *Source: databases of EUR-ACE labelled programmes (ENAEE authorised) and of ABET accredited programmes (10%)*

### Accreditations

The **European Network for Accreditation of Engineering Education (ENAEE)** is a non-profit organization that gathers accreditation and quality assurance agencies from various countries (mostly EU) and builds a pan-European framework for the accreditation of engineering education programmes. ENAEE has established the EUR-ACE (European Accredited Engineer) label, although it does not accredit directly engineering degree programmes itself. After positive evaluation of policies and procedures followed by member accreditation and quality assurance agencies, ENAEE authorizes them to award the EUR-ACE label to the engineering degree programmes accredited by these agencies. Currently, 15 agencies are authorized by ENAEE; they signed a Mutual Recognition Agreement, known as the EUR-ACE Accord.

The **Accreditation Board for Engineering and Technology (ABET)** is a non-governmental organization established in 1932 in the United States (originally as the Engineers' Council for Professional Development). Currently, there are 4564 post-secondary education programmes in applied and natural sciences, computing, engineering and engineering technology accredited by ABET, that are distributed over 895 institutions in 40 countries (i.a. in Austria, Netherlands, Poland, Portugal and Spain).

## INNOVATION (25%/26%)

The criterion composed of two indicators. The Scopus bibliometric database was the source for calculating the **Academic-Corporate Collaboration** indicator. The values for the **Research and Innovation Funding** are based on information from the CORDIS database.

- **Academic-Corporate Collaboration (ACC):** percentage of publications in the relevant discipline published between 2018 and 2022 that are co-authored by researchers affiliated to an institution outside academia. *Source: Scopus/SciVal (15%/16%)*
- **Research and Innovation Funding (FUND):** value of grants awarded to the university within the EU framework programmes funding research and innovation between 2018 and 2022 to finance research projects in the relevant discipline. *Source: CORDIS database (10%)*

### CORDIS

**Community Research and Development Information Service (CORDIS)** is the European Commission's principal and official service for delivering information on projects funded by the European Union's framework programmes for research and innovation, from the First Framework Programme (1984–1987, budget €3.8bn) to Horizon Europe (2021-2027, budget €95.5bn). CORDIS has a single search service that allows to perform simple searches (by term), combine them with filters that apply to selected content collections as well as edit queries to use advanced search syntax (with Boolean operators). The heart of the CORDIS repository is the public information on the projects that is derived from the grant agreements once they have been signed and includes i.a. the project's objectives, topics, dates, funding amounts and participants. Total number of projects in the repository is 125.962 and their cost exceeds €350bn.

The subject rankings list the following number of HEIs: • Chemical Engineering – 167 • Civil Engineering – 145 • Electrical, Electronic and Information Engineering – 177 • Environmental Engineering – 178 • Materials Engineering – 191 • Mechanical Engineering – 169 • Medical Engineering – 91.



## Method of calculation

The *EngiRank* rankings are modelled on the basis on the *Multi-Attribute Value Theory*. According to the theory, it was assumed - firstly - that it is possible to estimate the value, or the aggregate score, of each HEI (as well as the disciplines under consideration) taking into account impacts of the individual criteria as measured by corresponding indicators. Secondly, it was assumed that if the criteria are not equally important, then bringing them to comparability is possible by weighting the corresponding indicators with appropriate coefficients. Thirdly, the additivity of weighted criteria was assumed meaning that the final score is the linear combination of partial scores. Moreover, the indicators with an asymmetric distribution are generally subject to the transformation (square root or cube root) to reduce skewness of the distribution.

The partial scores for every indicator are calculated with reference to the leading institution. The score of 100 is assigned to the HEI with the highest indicator value and for the other institutions a proportional distance to the leader is calculated. The partnership in a European university alliance is a specific binary indicator corresponding - each of 92 universities listed in the institutional ranking that is a member of any European university alliance is assigned a score of 100.

Partial scores for all the indicators obtained by the HEI - both in the subject rankings and in the institutional ranking - are added using appropriate weights. Then the HEIs are ranked according to the weighted sum of scores in the descending order. The leading institution is assigned the final score of 100, and the subsequent institutions receive scores that are equal to the ratio of their weighted sum of partial scores to the one for the leader (in percentage terms). Position of HEIs in a ranking is determined using a discrimination threshold of 1% pkt. of the final score. It means that institutions with final scores differing by less than 1% pkt. occupy the same *ex aequo* position in the ranking.

*Warsaw - Brussels*  
20 October, 2023

Data Sources	
INDICATOR	DATA SOURCE
Research and innovation funding	CORDIS: <a href="https://cordis.europa.eu">https://cordis.europa.eu</a>
Patents	EPO PATSTAT: <a href="https://www.epo.org/patstat">https://www.epo.org/patstat</a>
European universities alliances	List of alliances: <a href="https://education.ec.europa.eu/education-levels/higher-education/european-universities-initiative/map">https://education.ec.europa.eu/education-levels/higher-education/european-universities-initiative/map</a>
EUR-ACE labelled programmes	ENAAE database: <a href="https://eurace.enaee.eu">https://eurace.enaee.eu</a>
ABET-accredited programmes	ABET-Accredited Program Search tool: <a href="https://amspub.abet.org/aps/">https://amspub.abet.org/aps/</a>
HEIs running engineering programmes	European Engineering Education Database: <a href="https://www.engineerseurope.com/eeed-database">https://www.engineerseurope.com/eeed-database</a>
Bibliometric indicators	Scival: <a href="https://www.scival.com">https://www.scival.com</a>



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## Partners of EngiRank Project



**“Perspektywy” Education Foundation** (*Fundacja Edukacyjna „Perspektywy”* – in Polish) is an independent, non-profit organization established (1998) to promote and support education. Its Board consists of present and former rectors and outstanding public figures interested in the development of higher education in Poland and globally.

“Perspektywy” publishes annually university ranking of Polish universities [www.ranking.perspektywy.org](http://www.ranking.perspektywy.org), and ranking of the best secondary schools in the country and Ranking of MBA Programs in Poland [www.mba.perspektywy.pl](http://www.mba.perspektywy.pl). These rankings are recognized as the most popular and reliable educational rankings in Poland. “Perspektywy” with the Conference of Rectors of Academic Schools in Poland (CRASP) runs a joint program “Study in Poland” promoting Polish universities abroad and helping universities attract international students. [www.studyinpoland.pl](http://www.studyinpoland.pl)

“Perspektywy” runs popular projects promoting participation of women in the STEM education and encouraging young women to enroll into studies in new technologies: Perspektywy Women in Tech Summit [www.womenintechsummit.pl](http://www.womenintechsummit.pl), IT for SHE [www.itforshe.pl](http://www.itforshe.pl)

“Perspektywy” due to its experience and competence in the area of higher education organizes prestigious international conferences and its members are invited as experts in Poland and abroad.

[www.perspektywy.org](http://www.perspektywy.org)

## Partners of EngiRank Project



**THE FOUNDATION FOR THE DEVELOPMENT OF THE EDUCATION SYSTEM** is the only institution in Poland with such extensive experience in managing educational programmes, especially EU programmes. FRSE's reputation has resulted in it being entrusted with the responsibilities of the Polish National Agency for the Erasmus+ Programme and the European Solidarity Corps.

**Among the programmes and initiatives managed by the Foundation are:**

**Erasmus+ • eTwinning • Eurodesk • Europass • Eurydice • WorldSkills • EPALÉ**

In addition, FRSE supports cooperation with eastern countries through the Polish-Lithuanian Youth Exchange Fund and the SALTO Eastern Europe and Caucasus Resource Centre. Since 2016, it has also managed the Polish-Ukrainian Youth Exchange Council. FRSE was also the operator of the European Economic Area (EEA) Scholarship and Training Fund.

- Until 2016, FRSE acted as the Contact Point for the SCIEX Scholarship Fund in Poland.
- From 2014 to 2023, FRSE implemented the Operational Programme Knowledge Education Development, which is the successor to the Operational Programme Human Capital.
- In 2018, FRSE became the National Agency of the European Solidarity Corps, a programme dedicated to volunteering, and the operator of the EEA-funded Education programme.
- The Foundation for the Development of the Education System has been nominated by the Ministry of National Education to be the coordinating institution for Poland's preparation for the EuroSkills and Worldskills competitions. With its acceptance into the WorldSkills community in October 2018, just after a promising start at the 2018 European competition, FRSE began organising qualifiers for the next editions.

### EuroSkills Gdansk 2023

The Foundation for the Development of the Education System was the organiser of the 8th edition of EuroSkills – the European Championships for Young Professionals, which took place in Gdansk between 5-9 September 2023, for the first time in Poland. This largest professional skills competition on the Old Continent brought together:

- **576** qualified young professionals under the age of 25
- **572** experts
- representatives from **32** countries
- the Polish national team won **13** medals.

A total of 335 medals were handed out in **43** skills during the competition, and **88** business partners joined in organising the event. The Polish team won:

- 3 gold medals
- 1 silver medal
- 3 bronze medals
- 6 Medallions for Excellence.

The EuroSkills Gańsk 2023 competition was the largest international event in which the Foundation for the Development of the Education System was honoured to participate.

## European Universities

The European Universities Initiative, implemented under the Erasmus+ programme, is a revolutionary project that aims to modernise European higher education. Key tenets of the initiative are the potential to increase the competitiveness of European universities, improve the quality of education, promote student and faculty mobility, support innovation and research, and strengthen social and cultural cohesion.

European Universities are an important step towards a more competitive and united European higher education system. They are an innovative response to the challenges of the 21st century and an excellent example of international cooperation. Behind this initiative is the idea of creating a long-term strategy in the field of education in which students, doctoral students and professors can use the resources of participating universities, allowing them to choose where and what they study through a flexible curriculum.

**The project can be implemented under one of two 'pathways':**

**Track 1:** Deepening existing transnational cooperation (continuation of cooperation within existing alliances and the possibility of expanding them to new actors).

**Track 2:** New transnational cooperation (creation of new alliances).

To participate in the European Universities project, an application is required to the EACEA via the Funding & Tenders Opportunities portal. The Foundation for the Development of the Education System organises Conferences of European Universities. Its purpose is to exchange experience, undertake joint initiatives leading to the development of long-term, structural, sustainable and systemic cooperation in education, research and innovation across Europe. Another activity is the organisation of a competition to award the most committed Polish universities working in international university partnerships.

## FRSE Publishing

The Foundation for the Development of the Education System also has its own publishing house, which publishes more than 30 titles a year. In addition, it issues guides, reports, monographs and examples of good practice – all titles are free to download at [czytelnia.frse.org.pl](http://czytelnia.frse.org.pl)

It is possible to subscribe to the Publisher's publications and to send free materials to schools, universities or NGOs interested in our offer. In addition, the Publishing House can help organise an educational conference, training course or workshop and supports such initiatives with publications from its reading room.

## InnHUB Innovation Centres

Erasmus+ InnHUBs are cross-sectoral innovation hubs whose main aim is to promote European education programmes and bring Erasmus+ offers closer together with universities, local authorities, vocational training centres, schools and businesses. Currently, Erasmus+ InnHUB innovation centers are operating in cities such as Kraków, Katowice, Poznań, Gdańsk, Wrocław, Opole and Łódź.

In addition, the InnHUB centres support Action 2 of the Erasmus+ programme, which raises awareness about cooperation opportunities for organisations and institutions such as schools, universities or NGOs and businesses.

The activities of InnHUB establishments are not only limited to content-related support – they are also involved in educational events and, with their activity, increase the level of innovation of projects implemented under the Erasmus+ programme.

[www.frse.org.pl/about-the-foundation](http://www.frse.org.pl/about-the-foundation)

# Engi rank

## NEXT GENERATION EUROPEAN RANKING OF ENGINEERING PROGRAMS

Project executed by  
Perspektywy Education Foundation (Poland) in partnership with  
Foundation for the Development of the Education System FRSE  
(Poland's National Agency for the Erasmus+ Programme  
and the European Solidarity Corps)

[engirank.eu](http://engirank.eu)

### Ranking Organizers



### Ranking Partner

