New challenges in the Engineering profession and education

Revision of the EUR-ACE Framework Standards and Guidelines

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ENAEE President-Elect

Rome, November 4th 2022

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XX Century Professional Training Paradox

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XXI Century Professional Training Paradox

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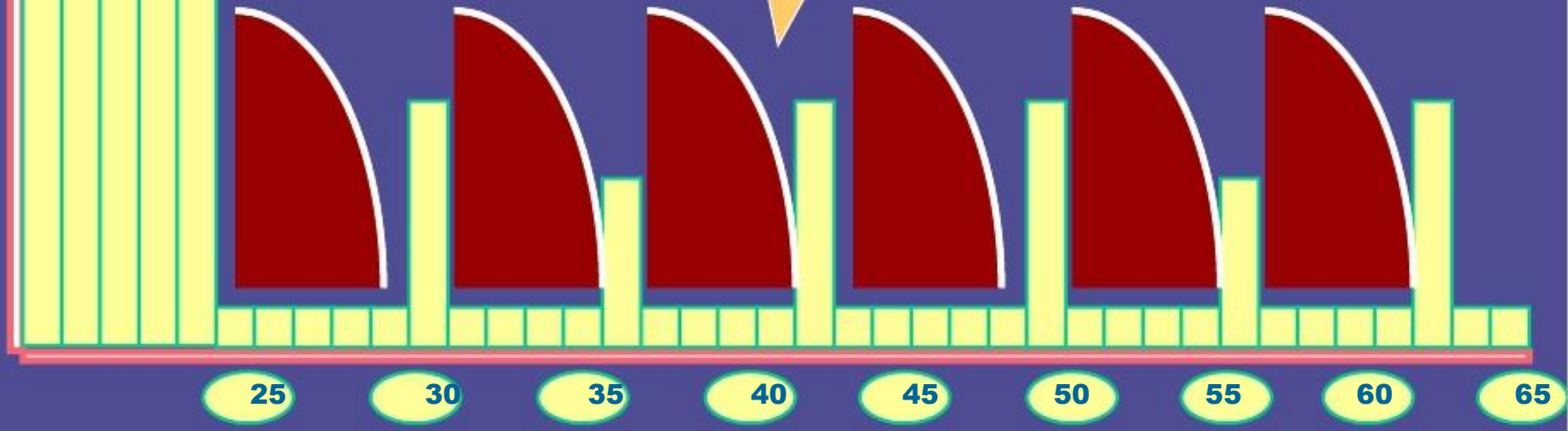
Resources

INICIAL Training

TECNOLOGICAL Changes
NORMATIVE Changes
ORGANIZATION Changes
Crisis = Change = Innovation

XXI Century NEEDS



Professional Periods

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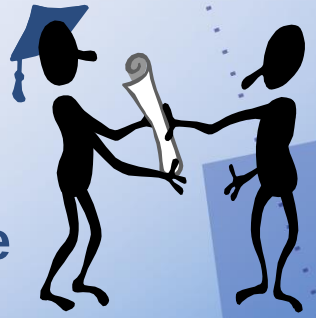
The discussion about the engineering profession !

We need more qualified engineers!

The requirements of the engineers' role have changed!

Engineering Education requirements

- **The engineering education needs to be more intensive and more attractive !**
- **The engineering education needs to be more adapted to the new realities!**



In reality...

Engineers role

- Engineering activities have a strong impact on society and economy; they are highly responsible, like doctors, architects, ...
- There is a need to ensure that engineering education is a path that leads to the profession of engineer (pre-professional accreditation)

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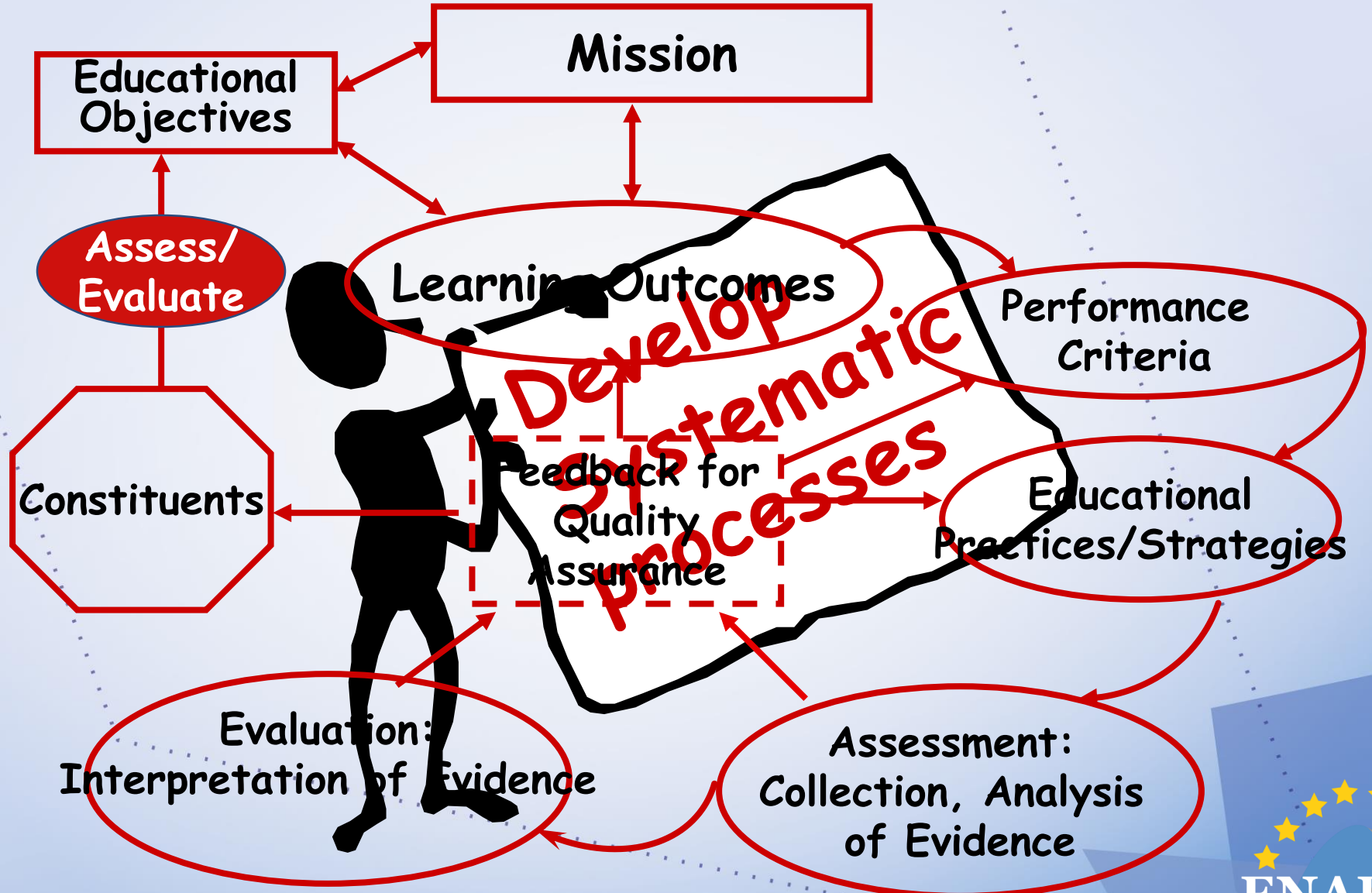
Quality assurance.
The world experience

- Validation and state accreditation of Higher Education Institutions and educational programs
- Professional accreditation of educational programs
- Certification of professional qualifications (Register of professional engineers and professional engineering educators)

Assessment for Quality Assurance



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Accreditation is the way to ensure quality
1755
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A worldwide trend

- Requirements and goals for the educational system to provide engineering graduates with the expected outcomes,
  - ✓ Quality Assurance for the programme providers and for the accreditation agencies

- What an engineering graduate is supposed to know and be able to do,
  - ✓ Programme outcomes/graduate attributes

European Network for the Accreditation of Engineering Education (ENAEE)

Awards the EUR-ACE® label

(2022- 15 authorized agencies – over 4000 programs with label)

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The 2 pillars of ENAEE « wisdom »

Quality assurance

Assessment of the processes and procedures:

- Programme aims
- Teaching and learning procedures resources
- Students (from admission to graduation)
- Internal quality assurance

Compliant with the

- ESG -European standards and guidelines for Quality Assurance in the EHEA-
- « Best practice in engineering programme accreditation » (IEA/ENAEE)

Programme outcomes

What an engineering degree must enable a graduate to demonstrate

8 domains for the knowledge, understanding, skills and abilities

- Knowledge and Understanding;
- Engineering Analysis;
- Engineering Design;
- Investigations;
- Engineering Practice;
- Making Judgement Skills;
- Communication and Team-working Skills;
- Learning Skills

The equivalences of the EUR-ACE and IEA systems is still an issue.

European education frameworks for engineers

Quality assurance

Bergen Communiqué (2005)

« Guarantee of Quality in HE »

European Standards and Guidelines (ESG, ENQA,…)

QA Register (EQAR)

Learning outcomes

European Qualification Framework

Dublin descriptors

EUR-ACE Framework Standards and guidelines (EAFSG)

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Revision of the EAFSG (2021)

The EASFG document 2021 reflect the changes in the accreditation environment:

- The rapid change in technology
- Online delivery of programmes
- Online assessment of programmes
- The social and ethical aspects of engineering work

Revision of the EAFSG (2021)

The EASFG document 2021 reflect the changes in the accreditation environment

- Assessment of programmes delivered in multiple campuses, potentially in different countries.
- Multiple authorized agencies in once country
- The effort and training needed to deliver programme level accreditation and the need to balance with emerging institutional level approaches.

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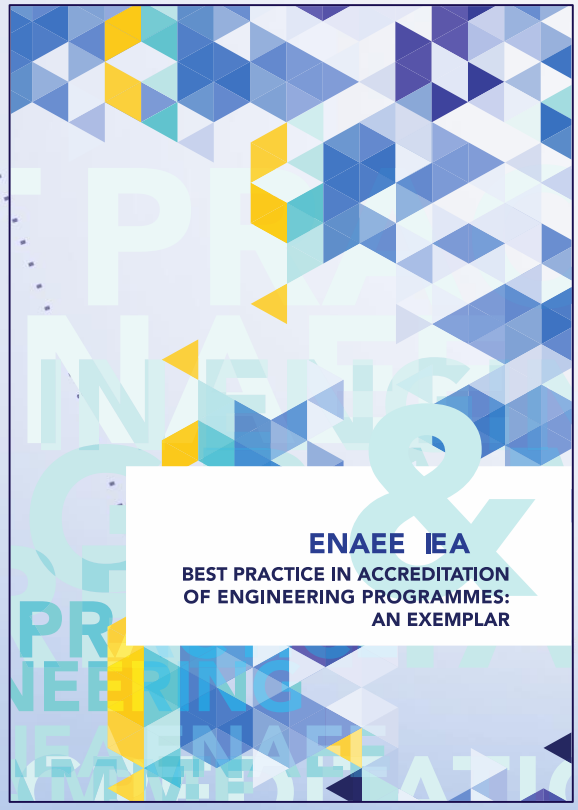
Revision of the EAFSG (2021)

The EASFG document 2021 reflect the changes in the accreditation environment

- Increase the alignment with the International Engineering Alliance.



Formally launched at a ceremony in Brussels on November 17th 2015.

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INTERNATIONAL ENGINEERING ALLIANCE

Agreed on October 2022 to be jointly revised

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Cooperation between IEA and ENAEE

IPEA

stands for

International Professional Engineers Agreement

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Common bases for the accreditation bodies

- Involve all stakeholders (academia, employers, society, students)
- Autonomy in their processes and their decisions
- Integrity and fairness (staff and experts)
- Accountability, public information.

Common bases for the accreditation bodies

- Enforce the EUR-ACE framework standards and guidelines (EAFSG, revised in 2021)
- Enforce the Quality Assurance standards for the HEI's and for itself (European standards and guidelines ESG)
- Implement the EUR-ACE accord (mutual recognition agreement)

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Agencies

1st and 2nd cycle Programs

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ENAEE Authorized agencies (2022)

1. France - CTI
2. Germany – ASIIN
3. Ireland - Engineers Ireland
4. Italy - QUACING
5. Portugal – OE
6. Russia - AEER
7. Romania – ARACIS
8. Turkey - MUDEK
9. United Kingdom - EC UK
10. Poland – KAUT
11. Switzerland – OAQ
12. Spain - ANECA
13. Finland – FINEEC
14. Slovakia – ZSVTS
15. Kazakhstan – KazSEE

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ENAEE Full Members

ENAEE Associate Members

CIAEP
THE CENTRE OF INDEPENDENT ACCREDITATION OF ENGINEERING PROGRAMS

CopI
Conferenza per l'Ingegneria

aani

Réseau Figure
CURSUS MASTER EN INGÉNIERIE

IGIP

LACCEI

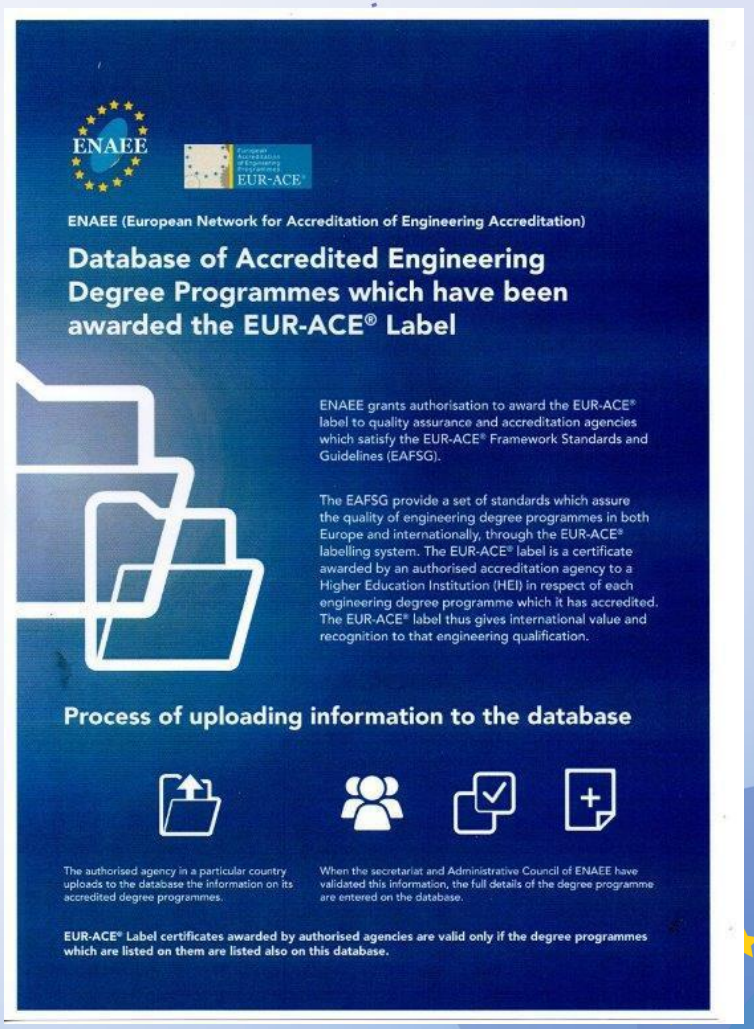
SEFI
European Society for Engineering Education

TEK
TEKNIIKAN AKATEEMISET

A major achievement

EUR-ACE® Database

A single database of accredited Engineering Degree programmes which have been have been awarded the EUR-ACE® label



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A major achievement

On 19th November 2014, the 13 (15, in 2022) authorised agencies signed a Mutual Recognition Agreement whereby they accept each other's accreditation decisions in respect of Bachelor and Master of Engineering degree programmes which they accredit.


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MUTUAL RECOGNITION OF EUR-ACE® LABELLED ENGINEERING DEGREE PROGRAMMES

Definitions

All authorised agencies therefore agree that:

Such a mutual recognition agreement is expected to:

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Accord

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The EUR-ACE shapes the future …

What is coming ahead ?

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Roles of accreditation

- Assure quality in education — Recognized in most countries
- Allow access to external funds — Still incipient
- Ease transfer of courses and programs — Needs improvement
- Employer confidence — Not relevant in some countries

Challenge / Opportunity

- Heads of states and governments called in the European Council Conclusions of 14 December 2017 on the Member States, the Council and the European Commission to take work forward in

'encouraging the emergence by 2024 of some 'European Universities'

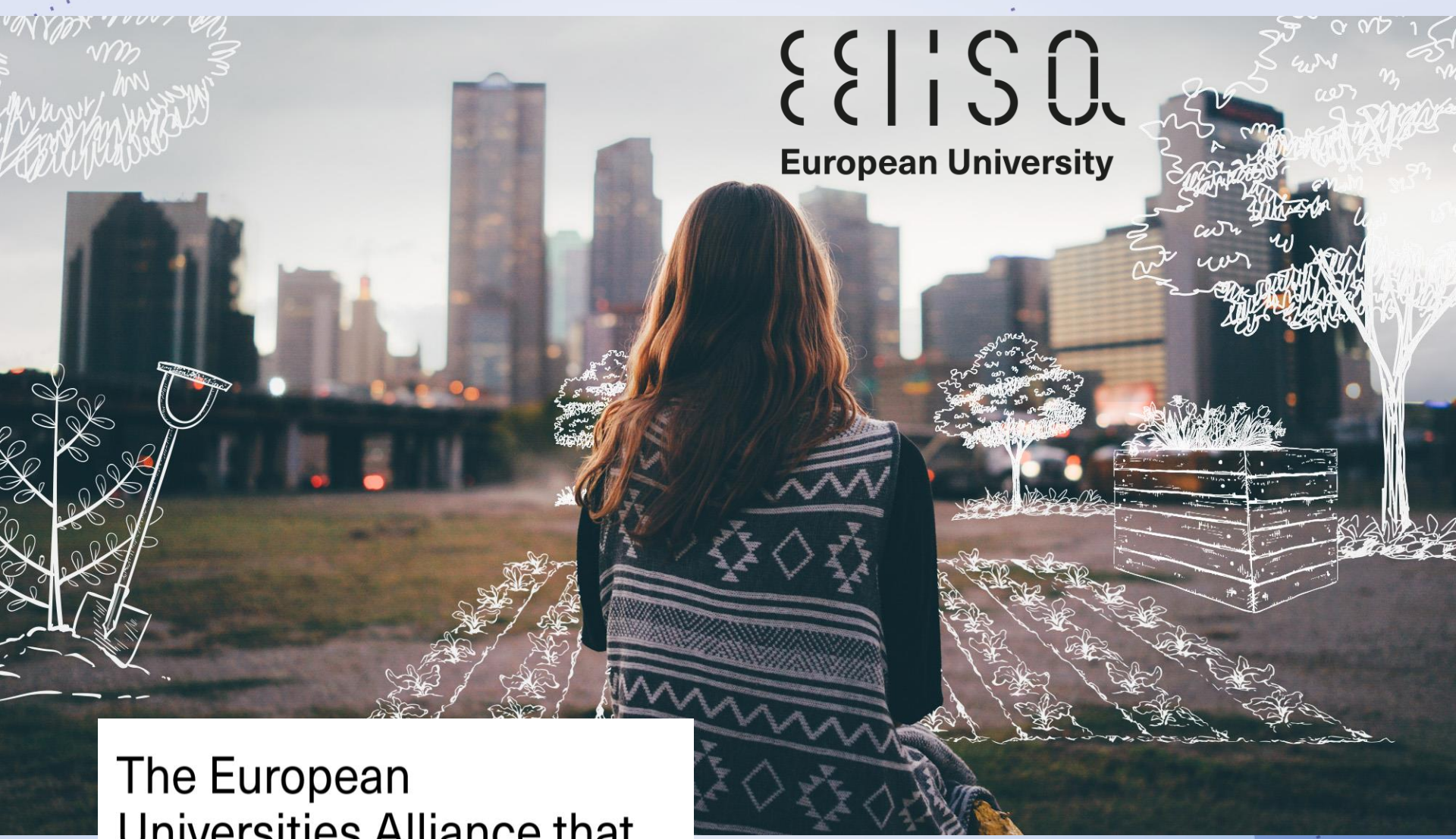
- consisting in bottom-up networks of universities across the EU which will

"enable students to obtain a degree by combining studies in several EU countries and contribute to the international competitiveness of European universities".

Challenge / Opportunity

- The Education Council Conclusions of 22 May 2018 highlighted that the **European Universities** could **play a flagship role in the creation of a European Education Area as a whole**".

To achieve this objective, the European Commission proposes an **unparalleled initiative which requires a quantum leap in cooperation between all types of higher education institutions from all regions in Europe and at all levels of the organization, across all areas of activity, from teaching and learning to research and innovation**.



The European Universities Alliance that will transform engineering education and society

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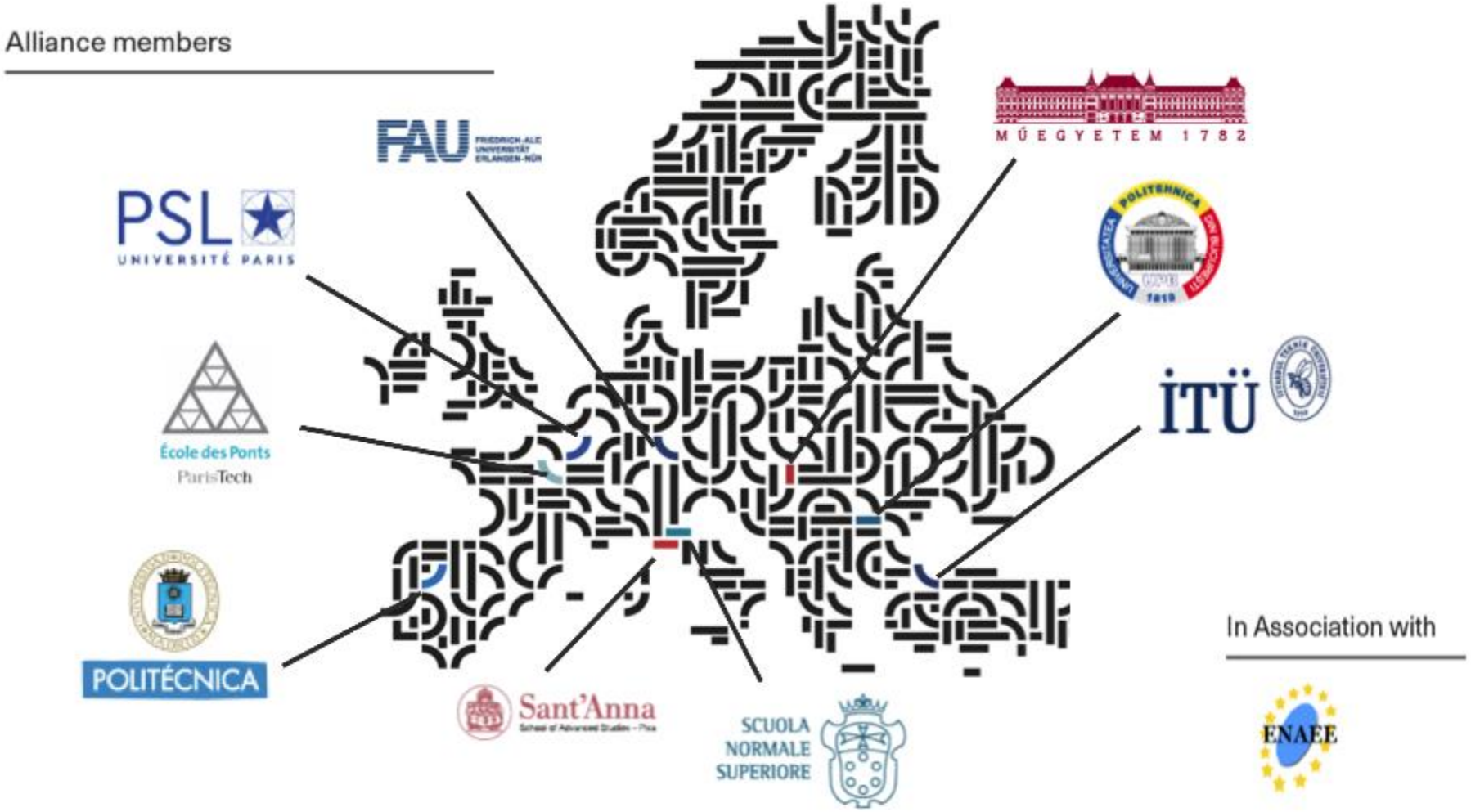
what is EELISA?

EELISA (**European Engineering Learning Innovation and Science Alliance**) is the first alliance of Higher Education Institutions from different countries in Europe meant to define and implement a **common model of *European engineer*** rooted in society.

EELISA' s acronym also pays tribute to women engineers
through the memory of **Elisa Leonida Zambirescu** (1887-1973), one of the very first women to obtain an
engineering degree in the world.



European Engineer model based on a single cross-border accreditation.

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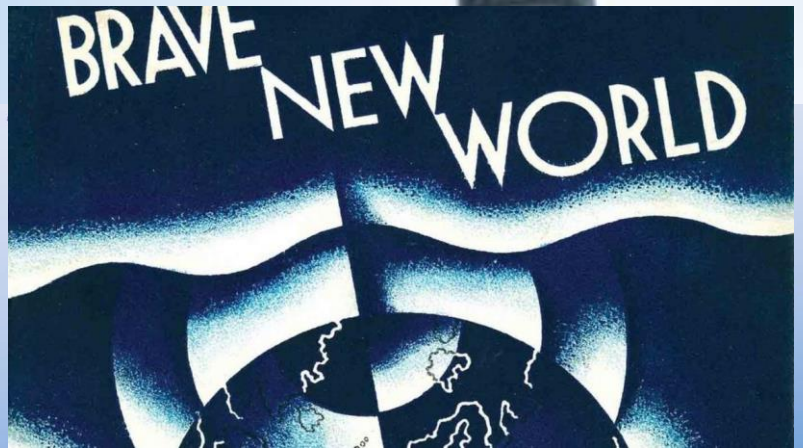
ACCREDITATION

Without Borders



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Professional engineering educators

The only Professional Regulating Body in the world recognized to regulate the Profession 2311 (Engineering Educator) under the ISCO (International Standard Classification of Occupations)

International Credentialing of Engineering Educators
(ENTER REGISTER)

Resulting from a EU Grant of approx. 0.8M EUR

Co-funded by the
Erasmus+ Programme
of the European Union

Certification induces educators to improve !

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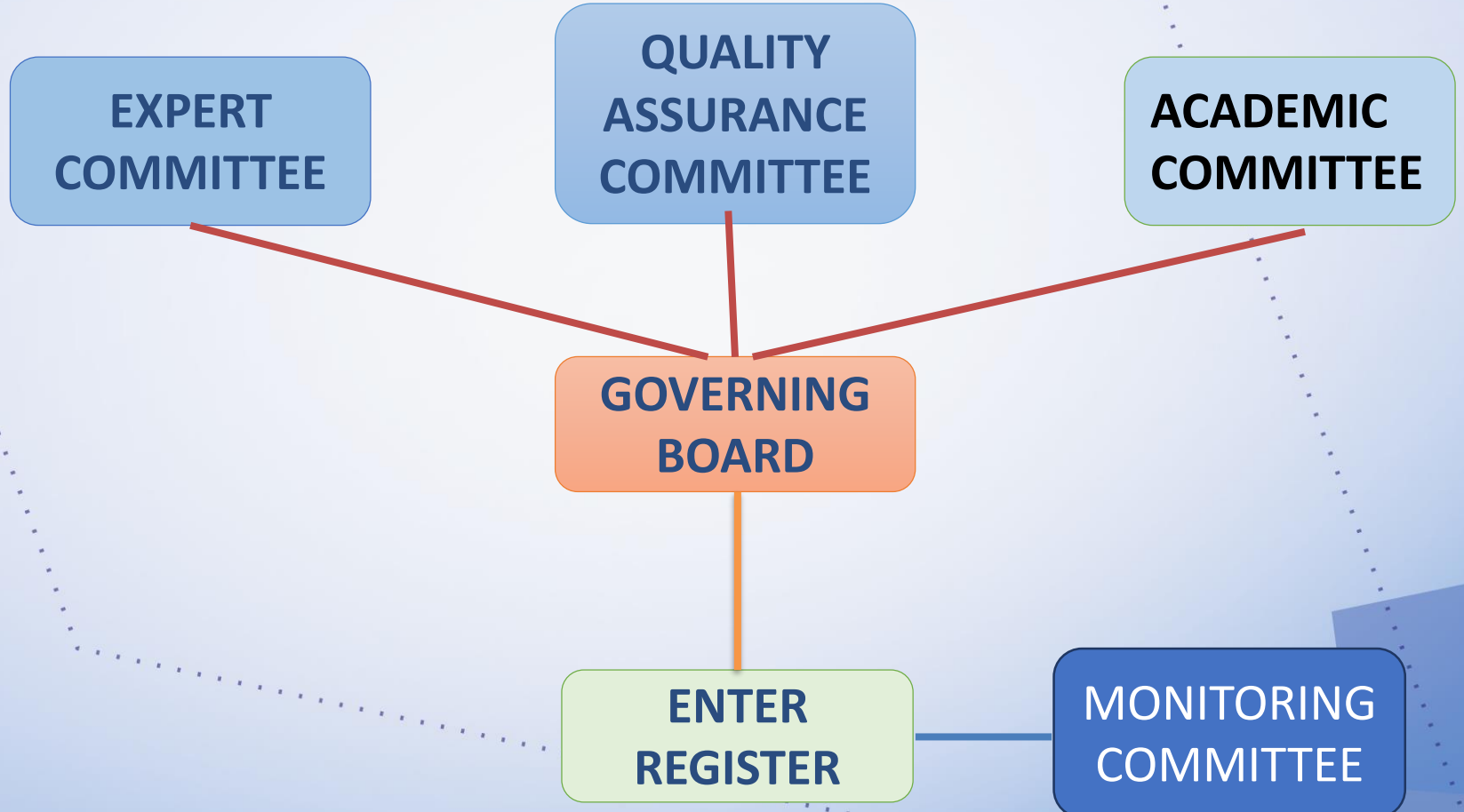
ENTER NETWORK STRUCTURE



How does it work?

ENGINEERING EDUCATOR REGISTRY

EDUCATOR

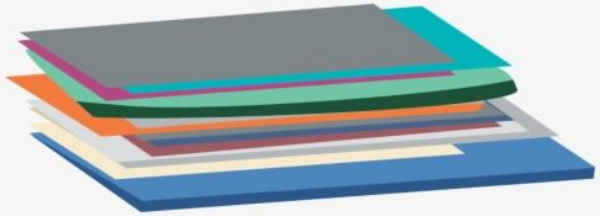
ENTER
REGISTER

The EDUCADOR requests to be evaluated as a possibility to be included into the ENTER Register as a professional engineering educator.

How does it work?

THE EDUCATOR SENDS HIS/HERS PROFESSIONAL PORTFOLIO

EDUCATOR



ENTER
REGISTER

The EDUCATOR uploads the PORTFOLIO online.

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How does it work?

THE MONITORING COMMITTEE REVIEWS THE PROFESSIONAL PORTFOLIO

Three different reviewers from other continents

ENTER REGISTER

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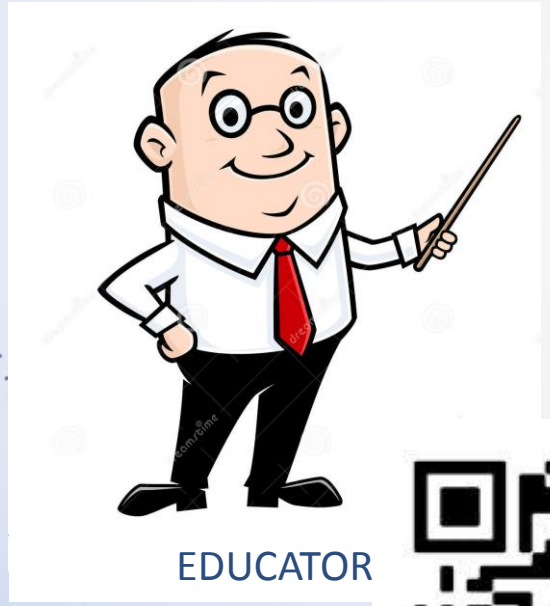
How does it work?

THE EDUCATOR IS INCLUDED IN THE PROFESSIONAL REGISTRY



EDUCATOR

ENTER
REGISTER

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How does it work?

PROFESSIONAL REGISTRY OF THE EDUCATOR

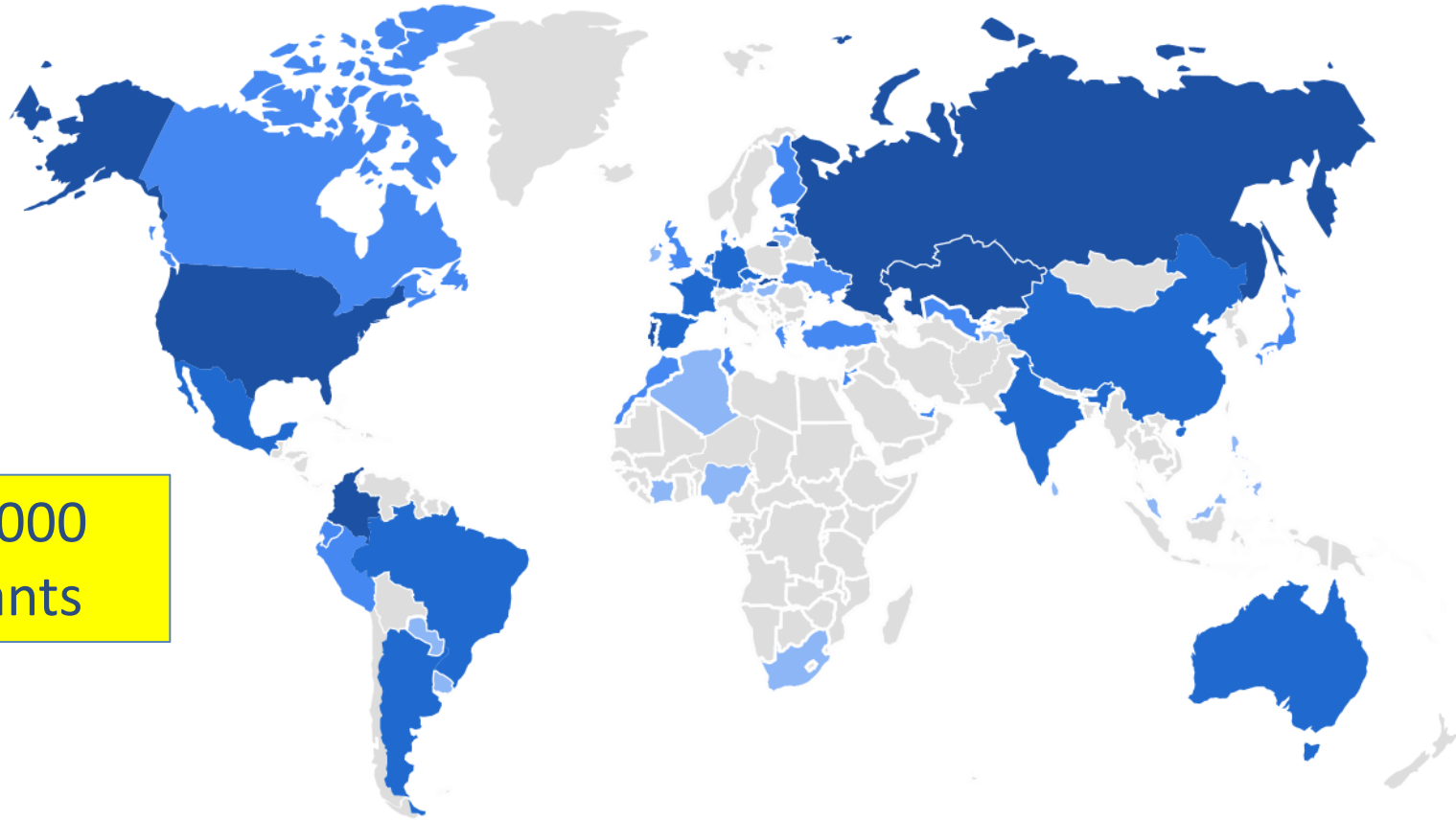
EDUCADOR

ENTER

REGISTER

The EDUCATOR is included in the professional list of international engineering educators – FOREVER -

Results



Over 4000 applicants

Geographical distribution of the applicants to the registry

Results

Countries with educators that already completed the register:

Argentina Belgium Brazil Bulgaria Cabo Verde Canada China Croatia Colombia Czechia Estonia France Georgia Germany India Ireland Italy Kazakhstan Lebanon Mexico Mozambique Panama Peru Portugal Russian Federation South Africa Spain Sweden Switzerland Tajikistan Turkey United Kingdom United States of America Uzbekistan

Evidencies

Some of the Engineering Educators

Professional Awarding Ceremonies are happening in different locations around the world

Evidencies

Some of the Engineering Educators

Professional Awarding Ceremonies are happening in different locations around the world

Importance for the Engineering Education Programs

The fulfillment of the required standards on quality of the professors for the international accreditation by the engineering programs can be done by presenting a majority of the professors as registered professional engineering educators.

Opportunities for Engineering Educators

Integrate the International Professional Engineering Educators Register

This is yo

EDUCATOR

info@enterprof.org

www.enterprof.org

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"He who stops being better stops being good."
Oliver Cromwell
There is always room for improvement…

Gracias!

Obrigado!

धन्यवाद

Спасибі !

Hvala!

Aitäh!

Teşekkürler !

Danke!

Takk!

Díky!

Thank you!

Grazie!

شكريه

спасибо !

Tack!

jcquadrado@gmail.com

Merci!

Dzięki !

Paldies!

მადლობა

Köszönöm!

Kiitos!

Gràcies!

ευχαριστίες !

Ačiū !

Multumesc!

Eskerrik asko !

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