



CampusFrance

National Agency for Promoting
French Higher Education Abroad

INTERNATIONALIZATION OF RESEARCH AND GRADUATE
STUDIES AND ITS IMPLICATIONS IN THE TRANSATLANTIC
CONTEXT

ATLANTA, 17th-18th of November 2008





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Transatlantic science and engineering graduate curricula
Obstacles for a harmonized transatlantic approach

◆ OUTLINES OF THE PRESENTATION :

1. KEY FIGURES
2. KEY OBSTACLES
3. SOLUTIONS AND RECOMMENDATIONS



- ◆ **WHAT ARE WE TALKING ABOUT ?**

- ◆ 80% of engineers are trained by four emerging countries
(China: 270 000 engineers/year;
Inde : 220 000;
Brazil: 80 000;
Russia: 60 000...etc.*)

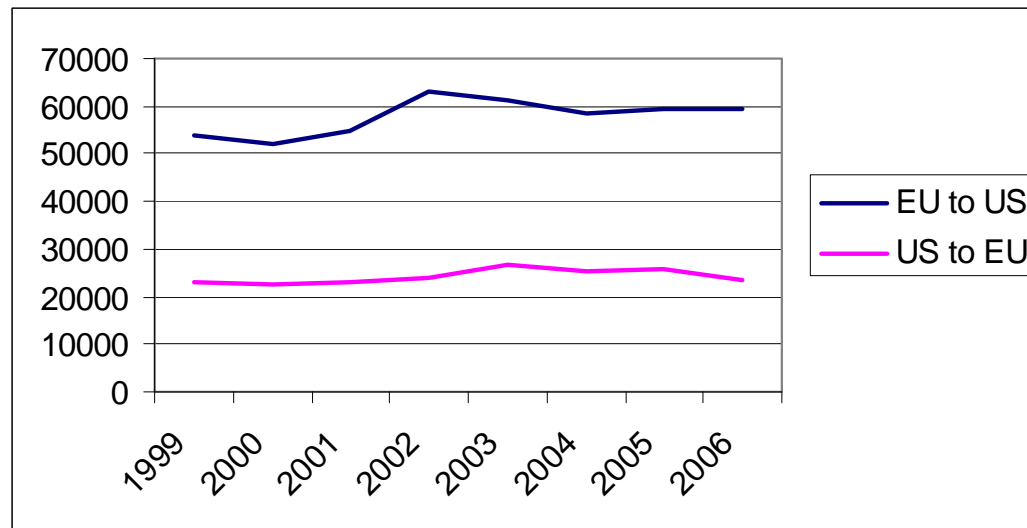
- ◆ 72% of all undergraduate degrees awarded worldwide in science and engineering were awarded outside the US;

- ◆ 78% for PhD level.

* Estimation ALTRAN Cie



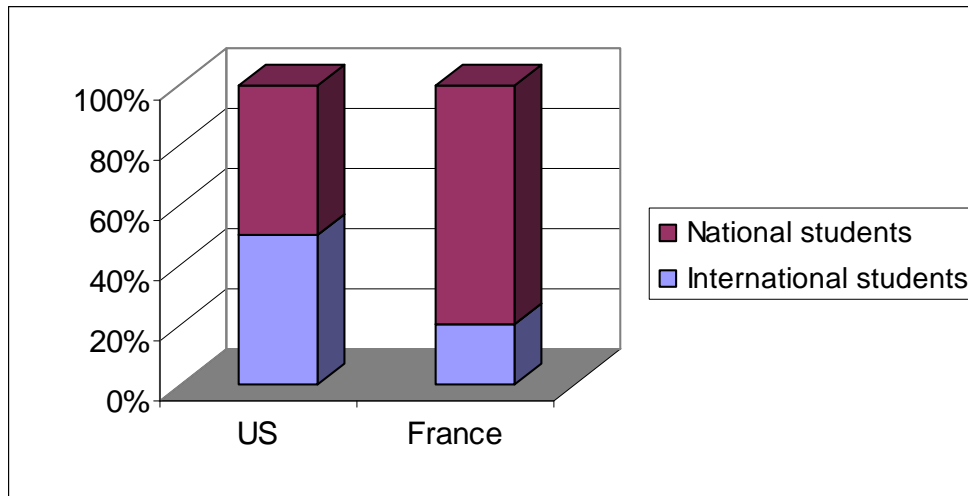
OVERVIEW OF MOBILITY BETWEEN THE US AND THE EU



Source UNESCO Database



I - KEY FIGURES (3) : INTERNATIONAL STUDENTS IN ENGINEERING



Source : Council of Graduate Schools September 2008, Survey of Graduate Enrollment And CGE 2005-2006



I - KEY FIGURES (4)

Focus on engineering studies in the USA

Table 2.3

Trends in Graduate Enrollment by Major Field of Study, 1997 to 2007

Major Field	Avg. Annual		Avg. Annual
	% Change 2006 to 2007	% Change 2002 to 2007	% Change 1997 to 2007
Biological Sciences*	1%	3%	2%
Business	-1%	0%	0%
Education	-1%	1%	1%
Engineering	5%	1%	3%
Health Sciences	9%	7%	4%
Humanities & Arts	0%	1%	0%
Physical Sciences	2%	0%	2%
Public Administration and Services	4%	2%	1%
Social Sciences	2%	3%	1%
Other Fields**	-3%	-1%	2%

*"Biological Sciences" includes agriculture.

**The category "Other Fields" includes architecture, communications, home economics, library science, and religion.

Source: CGS/GRE Survey of Graduate Enrollment and Degrees.



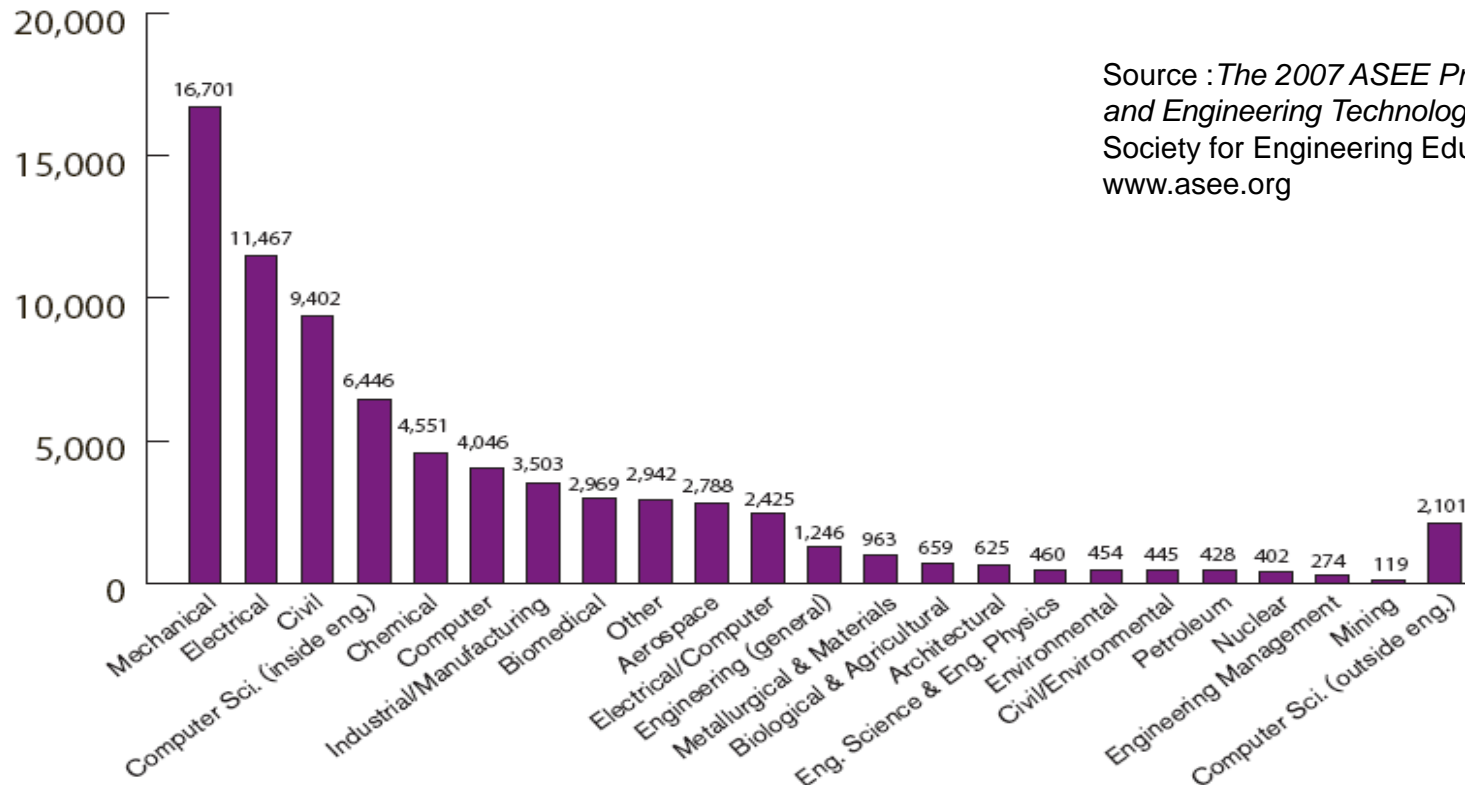
Focus on engineering studies in the USA



BACHELOR'S DEGREES, 2006-2007

By the Numbers

BACHELOR'S DEGREES BY ENGINEERING DISCIPLINE: 73,315



Source : *The 2007 ASEE Profiles of Engineering and Engineering Technology Colleges*, American Society for Engineering Education, 20.06.2008, www.asee.org



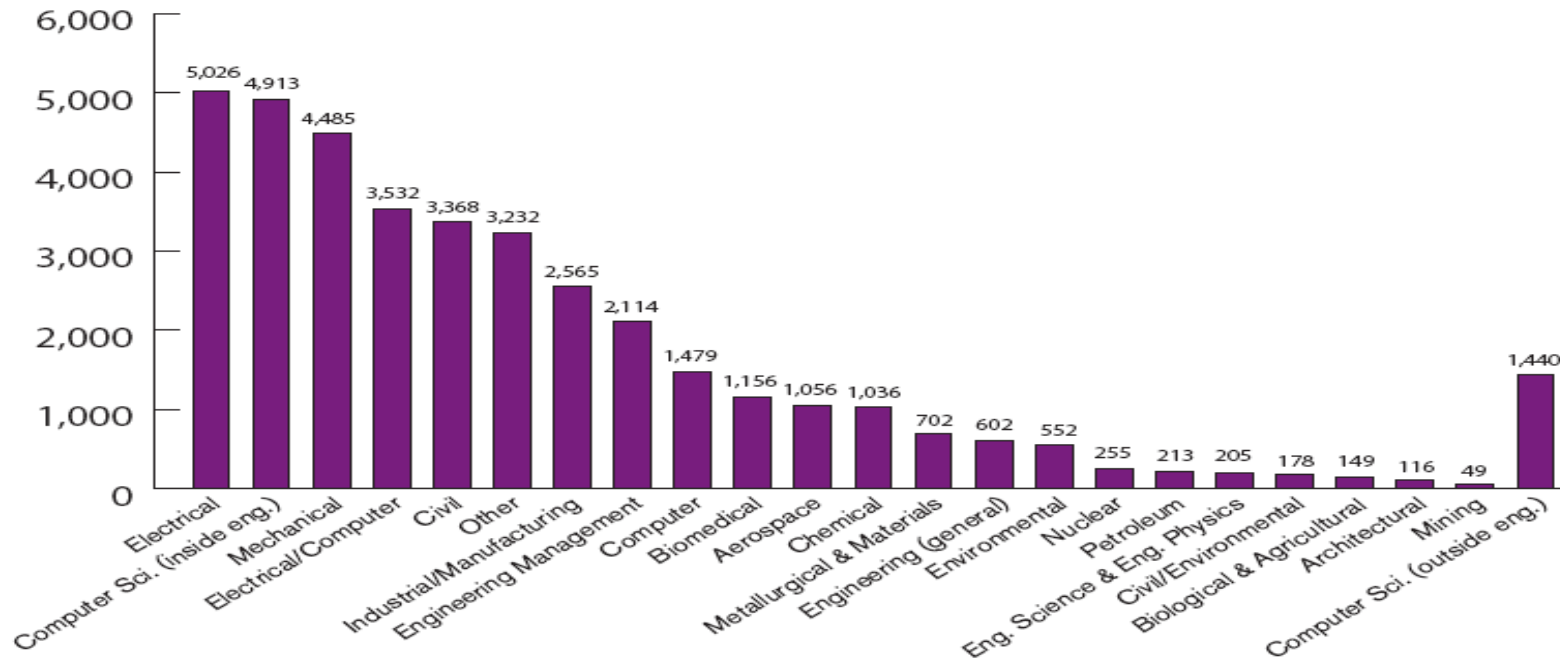
Focus on engineering studies in the USA

Source : *The 2007 ASEE Profiles of Engineering and Engineering Technology Colleges*, American Society for Engineering Education, 20.06.2008, www.asee.org

ENGINEERING MASTER'S DEGREES, 2006-2007

By the

MASTER'S DEGREES BY DISCIPLINE: 36,983





Focus on engineering studies in the USA

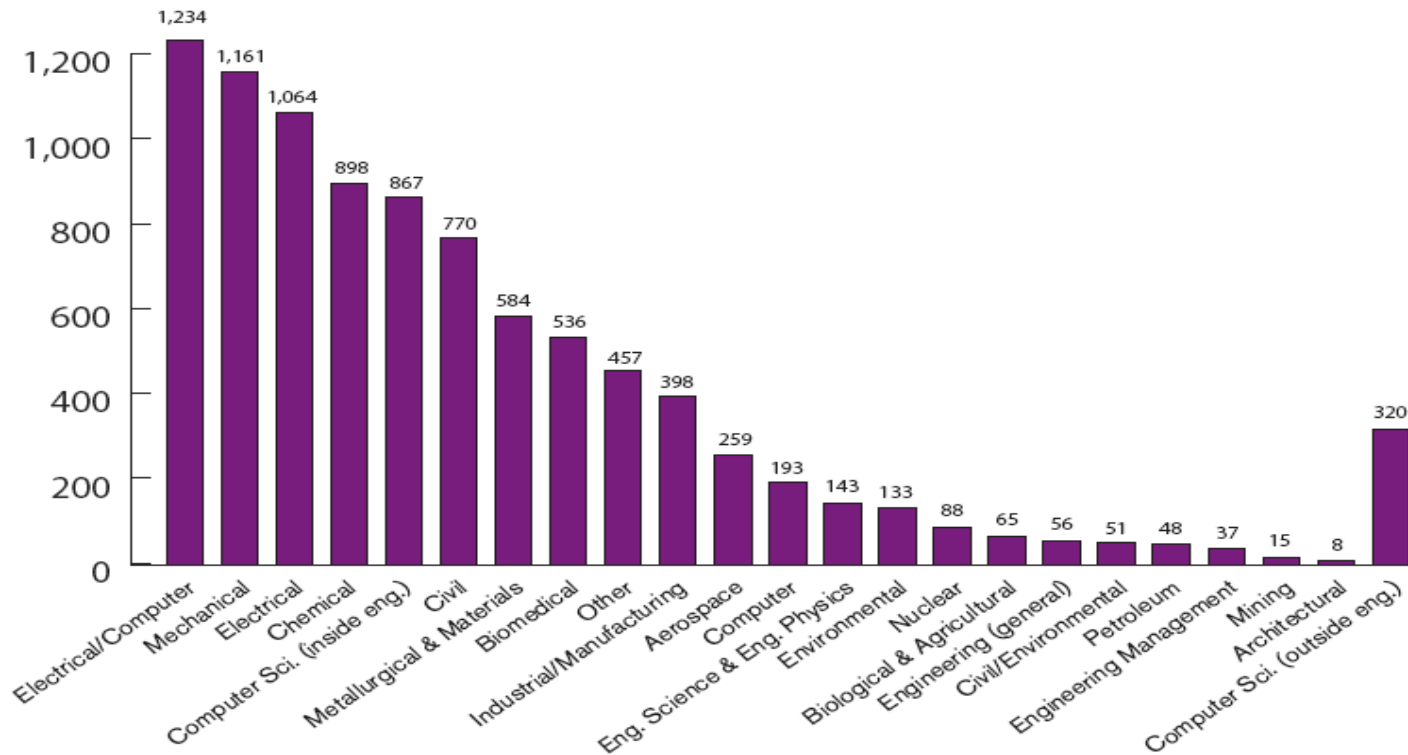
Source : *The 2007 ASEE Profiles of Engineering and Engineering Technology Colleges*, American Society for Engineering Education, 20.06.2008,

www.asee.org

ENGINEERING DOCTORAL ENROLLMENT AND DEGREES

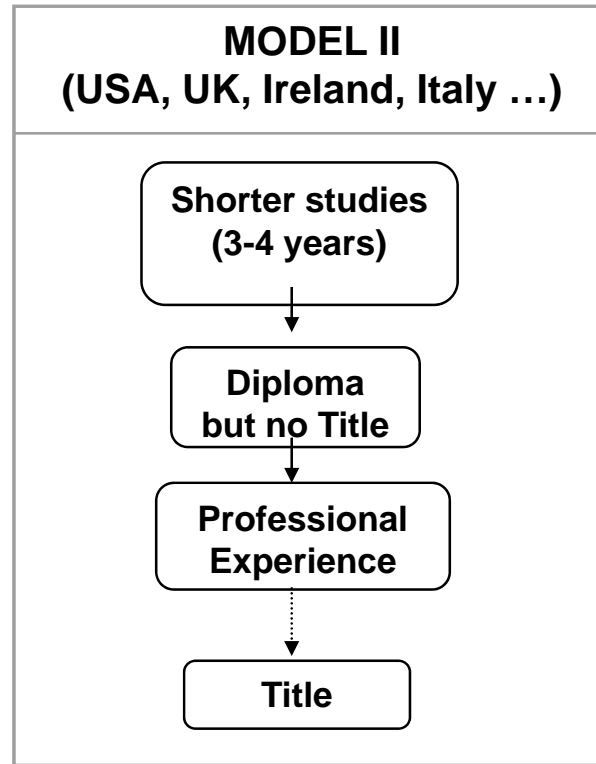
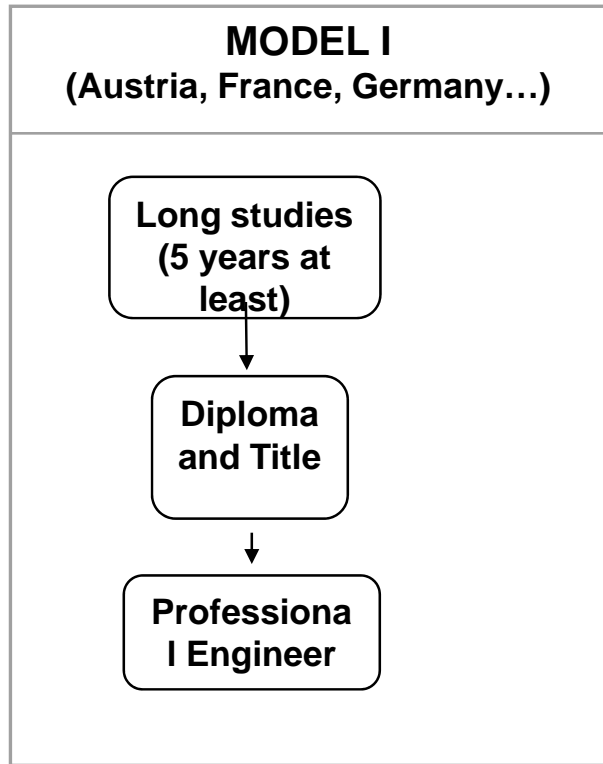
By the Numbers

DOCTORAL DEGREES BY DISCIPLINE: 9,065



II - KEY OBSTACLES: CURRICULAR BRAKES (1)

- ◆ Engineering studies and the engineering profession : 2 main models with variations





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KEY OBSTACLES

CURRICULAR OBSTACLES(2)

FRANCE	<ul style="list-style-type: none">•A 5 years Master's Degree (often in French Grandes écoles)•Chartered engineer if the Higher Education Institution is recognised by the "Commission des Titres d'ingénieur"•No professional experience required but the 5 years' study include several placements and internships abroad
GERMANY	<ul style="list-style-type: none">• A Bachelor + a Master's Degree (at least 5 years) at a University or Fachhochschule to get a Diplomstudium•Recognition of Engineering qualifications under the responsibility of the Länder•The title « Ingenieur » is an academic title awarded after completing the Diplomstudium•To use the title « Beratender Ingenieur » : registration with a Chamber
UK	<ul style="list-style-type: none">•The MEng degree (master of Engineering) = usually a 4 year course•Chartered engineer after significant professional experience + recognition by the Engineering Council•3 types of Engineers : Chartered Engineers (Ceng), Incorporated (Ieng), Engineering Technicians (Eng Tech)
USA	<ul style="list-style-type: none">•A Bachelor's Degree in Engineering (4 years) or a Bachelor's Degree of science in Engineering•Accreditation by the ABET : Accreditation Board for Engineering and Technology, accredits disciplines, not schools; within an emerging school, some fields may be accredited while others are not.• Regulation by each State

- ◆ **THREE GUARANTEES FOR INTERNATIONAL MOBILITY**
Academic, Pedagogical and Logistical
- ◆ **IS THE WORK RECOGNIZED BY THE INSTITUTION ?**
- ◆ **HOW TO ASSESS THE RESULT OF MOBILITY ?**

KEY SOLUTIONS (1):
ENHANCING PARTNERSHIPS BETWEEN HEIs

- ◆ BY ENCOURAGING THE IDENTIFICATION AND THE CHOICE OF THE PARTNERS
- ◆ BY GUARANTEEING THE QUALITY OF THE MOBILITY (TRIPLE SECURITY)
- ◆ BY ASSESSING ACQUIRED GLOBAL COMPETENCIES
- ◆ BY REWARDING THE FACULTIES OR THE ORGANIZERS OF THE MOBILITY

For the various forms of mobility see Alan Parkinson, « Engineering Study Abroad Programs: Format, Challenges, Best Practices », *Online Journal for Global Engineering education*, vol.1, issue 2, Berkeley electronic Press, 2007.

<http://digitalcommons.uri.edu/ojgee>



KEY SOLUTIONS (2) : TRANSATLANTIC PROGRAM/GLOBAL E3

Participating Global E³ Countries and Universities



Around 90 participating institutions



AIM OF THE PROGRAM :

- ◆ The EC and the US Department of Education, Fund for the Improvement of Post Secondary Education (FIPSE) decided to promote a Transatlantic Degree Programme in 2002.
- ◆ The new programme plans to implement over 200 projects with some 6 000 EU and US individuals participating in mobility activities over the eight year period from 2006 to 2013.
- ◆ Budget (per year) : 4.5 Million € from the EC + around 4.5 € Million from the FIPSE
- ◆ EU and US institutions joint programmes of study
Eligible actions :
 - 1) Transatlantic Degree Consortia Projects
 - 2) Excellence Mobility project
 - 3) Policy Oriented Measures

◆ OVERVIEW

	2002	2003	2004	2006*	2007
HEIs INVOLVED	39	38	41	14*	32
SELECTED PROJECTS	13	12	13	14	14
PROJECTS IN ENGINEERING	1	1	4	5	5

*No selection in 2005

*Only the leaders of the consortium were presented in 2006

- ◆ German initiative: Transatlantic Engineering Dialogue: Germany / USA
<http://www.daad.org/?p=dialogue>
- ◆ The French Schools of Engineering and Universities of Technology are working on a similar project.
- ◆ Turning Bilateral agreements into multilateral ones

Ex : Washington Accord : the first in establishing that graduates of programs accredited by each member nation are prepared to practice engineering at the entry level (Bachelor's level)

KEY SOLUTIONS (4):

A decentralized European accreditation system of engineering study programmes

- ◆ The EUR-ACE project : EUR-ACE Bachelor” (European Accredited Engineering Bachelor, first cycle) and “EUR-ACE Master” (European Accredited Engineering Master, second cycle).
- ◆ The EUR-ACE label can be added to the accreditation
- ◆ At present, the Agencies authorized to award the EUR-ACE label are:
 - [ASIIN](#) (DE)- Fachakkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik e.V.
 - [CTI](#) (FR) - Commission des Titres d'Ingénieur
 - [ECUK](#) (UK) - Engineering Council UK
 - [Engineers Ireland](#) (IE)
 - [Ordem dos Engenheiros](#) (PT)
 - [RAEE](#) (RU) - Russian Association for Engineering Education

KEY SOLUTIONS (4): MAKING A EUROPEAN ENGINEERING TITLE A REQUIREMENT

- ◆ FEANI, The European Federation of National Engineering Associations took the initiative to create and promote the Eurlng
- ◆ The EUR ING title delivered by FEANI is designed as a guarantee of competence for professional engineers
- ◆ The criteria are fixed by the FEANI <http://www.feani.org/>
- ◆ To apply for the EUR ING Title: the fully completed Application Form together with the requested supporting documents must be submitted to the National Member where the applicant is registered
- ◆ The European Commission, in a statement to the European Parliament, has recognized the FEANI Register and the EUR ING title as valuable tools for the recognition of national diplomas among member states



◆ CONCLUSIONS

1. Reliable statistics from the EU are needed
2. Transatlantic Programs have to be promoted
3. Phd's level has perhaps to be managed
4. Transforming bilateral accords into multilateral accords has to be encouraged
5. The “triple security” has to be guaranteed