



Meta Frameworks and Sectoral Frameworks in Engineering Education

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To say what I am going to say...

① Setting the stage

- ① Life Today
- ① From Bologna to Leuven... and beyond - the core of the reforms

② Qualifications Frameworks

- ② QF complementary layers - Meta Frameworks
- ② QF complementary layers - Sectoral Frameworks
- ② QF complementary layers - Descriptors at Syllabus level

③ Quality Assurance and Recognition of Qualifications

- ③ Academic degree structures and Quality Assurance in Engineering
- ③ Recognition in a global context

④ Closing Notes



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Meta Frameworks and Sectoral Frameworks...

Life in a Global World

A new Paradigm of Coexistence - COOPETITION

- ☞ **A very fast changing World**
- ☞ **Progress observed in Science and Technology, namely**
 - ✓ **in digital systems and communications**
 - ✓ **in health and life sciences**
- ☞ **Political changes that took place in Europe in the eighties**
- ☞ **Expectations and demands of Society and of Today's Life**
 - ✓ **Education for All**
 - ✓ **Quality requirements and increased competitiveness**
 - ✓ **Need for mobility**
 - ✓ **Need for Lifelong Learning**
- ☞ **A NEW PARADIGM of COOPERATION AND COMPETITION**
- ☞ **RECOGNITION OF QUALIFICATIONS - A COMMON NEED**

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Meta Frameworks and Sectoral Frameworks...

From Bologna to Leuven/Louvain-La-Neuve... and beyond

Policy Areas, the Structure and the Substance

Building the European Area of Knowledge

- ☞ **Political objectives and concerns - policy areas**
 - ✓ **Mobility**
 - ✓ **Social dimension**
 - ✓ **Employability**
 - ✓ **Lifelong Learning**
 - ✓ **Attractiveness or the Process in a global dimension**
 - ✓ **Challenges posed by Global Competition - 'Borderless Higher Education Market'**
 - ✓ **Need for International Cooperation - recognition**
 - ✓ **The demographic challenge - new publics**
 - ✓ **New leading roles and responsibilities**
 - ✓ **Monitoring quality within diversity**
 - ✓ **Accessing diverse sources of funding**

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Meta Frameworks and Sectoral Frameworks...

From Bologna to Leuven/Louvain-La-Neuve... and beyond

Policy Areas, The Structure and the Substance

Building the European Area of Knowledge


☞ **The Structure - action lines and instruments for action**

- ✓ **A Degree Structure -**
 - **Based on recognised QUALIFICATIONS FRAMEWORKS**
- ✓ **A System to measure work and OUTCOMES**
 - **The ECTS credit and accumulation system**
- ✓ **A System to document qualifications**
 - **The DIPLOMA SUPPLEMENT**
- ✓ **A System to guarantee transparency**
 - **Building accepted QUALITY ASSURANCE procedures**
- ✓ **A System for recognition of qualifications**
 - **OVERCOMING DIFFICULTIES of the diversity of 'recognition cultures'**


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Meta Frameworks and Sectoral Frameworks...

From Bologna to Leuven/Louvain-La-Neuve... and beyond

Policy Areas, Structure and the Substance

Building the European Area of Knowledge


☞ **The Substance - the latecomer in the Bologna Process...**

- ✓ **Changes to a large extent still to occur**
 - **New contents... closer to more immediate Societal concerns**
 - **New programme structures, linked to a concept of lifelong Learning**
 - **New Methods - change from**
 - ✓ **Teacher-Centred to Student-Centred methodologies**
 - ✓ **Teaching based on Teacher Inputs to Learning Centred in well defined objectives - Learning Outcomes**
 - ✓ **Teaching Times to Student Workloads required to achieve desired Learning Outcomes**


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Meta Frameworks and Sectoral Frameworks...


A signal of the slow rising of relevance... Use of the terms 'Learning Outcomes' and 'Frameworks' in the Bologna Communiqués

	Learning Outcomes	Frameworks
Bologna, 1999	0	0
Prague, 2001	0	2
Berlin, 2003	1	6
Bergen, 2005	1	10
London, 2007	4	15
Leuven/Louvain-La-Neuve, 2009	4	8

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Meta Frameworks and Sectoral Frameworks...


Bologna as one of the dimensions of an European Process

☞ The Bologna 2020 Ghent Conference, 19-20 May, 2008


Professor Marek Kwiek, Rapporteur
Center for Public Policy, Poznan University, Poland

- ✓ **The Bologna Process should not be viewed in isolation from global processes** - it is an example of a response to global integration, massification of HE and the accompanying financial resource challenge.
- ✓ **Also it should not be viewed in isolation from European societies and economies.**
- ✓ **Tough times are coming - but change is always tough!**
- ✓ **Things are going to change fundamentally.**

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To say what I am going to say...

- ① **Setting the stage**
 - ① Life Today
 - ① From Bologna to Leuven... and beyond - the core of the reforms
- ② **Qualifications Frameworks**
 - ② QF complementary layers - Meta Frameworks
 - ② QF complementary layers - Sectoral Frameworks
 - ② QF complementary layers - Descriptors at Syllabus level
- ③ **Quality Assurance and Recognition of Qualifications**
 - ③ Academic degree structures and Quality Assurance in Engineering
 - ③ Recognition in a global context
- ④ **Closing Notes**


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Meta Frameworks and Sectoral Frameworks...

Qualifications Frameworks in Lactus Sensus

The different layers - Who does what...

- ☞ **High level descriptors - Meta Frameworks**
 - ✓ Characterized at institutional level of governments and stakeholders
 - ✓ They represent the 'legal crust'
- ☞ **Complemented by Sectoral and Specific descriptors**
 - ✓ By area and specialty
 - ✓ In close cooperation with higher education institutions and professional associations
 - ✓ In transnational cooperation
 - ✓ They represent Bologna in practice
- ☞ **Complemented by Curriculum descriptors - core contents**
 - ✓ Typically developed in Education Working parties and Academic Consortiuns, at European Level, or within regulatory bodies at national level
 - ✓ They are one of the basis for credibility of the whole system

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Meta Frameworks and Sectoral Frameworks...

Qualifications Frameworks and the Directive for Recognition of Professional Qualifications


☞ **Three major documents at High Level**

- ✓ **The QF-EHEA -Qualifications Framework for the European Higher Education Area**
 - **Adopted in Bergen 2005, within the Bologna Process**
- ✓ **The EQF-LLL - European Qualifications Framework for Lifelong Learning**
 - **Adopted by the EC - approved on April 23, 2008 by the Parliament and the Council of the European Union**
- ✓ **The Directive for Recognition of Professional Qualifications, approved by the European Parliament and by the Council on September 7, 2005**
 - **National laws should have been passed in all EC Countries till the end of 2007**


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Meta Frameworks and Sectoral Frameworks...

Three major documents I - QF-EHEA - Qualifications Framework for the European Higher Education Area

☞ **A degree structure with three main cycles and a short cycle within or linked to the First Cycle**

☞ **Adopts the Dublin Descriptors developed by the Joint Quality as the cycle descriptors, characterizing levels to be attained in**


- *knowledge and understanding*
- *applying knowledge and understanding*
- *making judgements*
- *communication*
- *Learning skills*

☞ **These are high level broad descriptors that will have to lead to more specific descriptors in each area or specialty within a given area**


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Three major documents

II - EQF-LLL - The European Qualifications Framework for Lifelong Learning

- ☞ Approved by the Parliament and the Council of the European Union on April 23, 2008
- ☞ Adopts 8 levels of qualifications characterized in terms of
 - *Knowledge*
 - *Skills*
 - *Competences*
- ☞ Adopts common principles for Quality Assurance in Higher Education and Vocational Education and Training in the context of the European Qualifications Frameworks
- ☞ Establishes a link of compatibility with the Framework for Qualifications of the European Higher Education Area

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Three major documents

III - The Directive for Recognition of Professional Qualifications (September 2005) (I)

- ☞ Reaffirms previous Directive, accepting 7 professional areas with recognized specifications
- ☞ Engineering (as Law) is out of such group
 - ✓ For these - three main levels are recognized as associated to professional qualifications (the all important Article 11)
- ☞ Right now, the European Database of regulated professions of the EU Member states, Iceland, Norway, Lichtenstein and Switzerland is available for consultation at
http://ec.europa.eu/internal_market/qualifications/regprof/index.cfm

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Meta Frameworks and Sectoral Frameworks...

Three major documents


III - The Directive for Recognition of Professional Qualifications (II)

- ☞ **Article 11 - Five levels of qualification particularly relevant for professions that are out of the Annex**
 - ✓ **2 levels requiring secondary education, general or vocational**
 - ✓ **1 level, requiring short post-secondary education, not necessarily at higher education level, plus professional training**
 - ✓ **2 levels of post-secondary education at higher education level, plus adequate professional training**


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Meta Frameworks and Sectoral Frameworks...

Three major documents



III - The Directive for Recognition of Professional Qualifications (III)



- ☞ **Art. 11, e) - higher level**
 ...completed a post-secondary course of at least four years' duration...at a university or establishment of higher education...and where appropriate completed professional training...
- ☞ **Art. 11, d) - intermediate level**
 ...training at post-secondary level of at least three and not more than four years' duration...at a university or establishment of higher education...as well as the professional training that may be required...
- ☞ **Art. 11, c) - lower level**
 ...training at post-secondary level other than that referred in d) and e) of a duration of at least one year...as well as the professional training which may be required in addition to that post-secondary course...


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	Bologna QF-EHEA CYCLES	European Union EQF-LLL LEVELS	EU-Directive of Professional Recognition Art. 11 - LEVELS
	Third Cycles	Level 8	
	Second Cycles	Level 7	Art 11º e)
	First Cycles	Level 6	Art. 11º d)
	Short Cycles Linked to or Within First Cycles	Level 5	Art. 11º c)
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	<p>☞ The EQF-EHEA, the EQF-LLL and the Directive point out in the same direction</p> <p>✓ Recognition of different qualification levels linked to formal education</p> <p>☞ They fit remarkably well in the world of engineering and the offer of engineering education in Europe</p> <p>☞ They should obviously be translated into our Quality Assurance Systems</p>		
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Meta Frameworks and Sectoral Frameworks...


To say what I am going to say...

- ① **Setting the stage**
 - ① Life Today
 - ① From Bologna to Leuven... and beyond - the core of the reforms
- ② **Qualifications Frameworks**
 - ② QF complementary layers - Meta Frameworks
 - ② **QF complementary layers - Sectoral Frameworks**
 - ② QF complementary layers - Descriptors at Syllabus level
- ③ **Quality Assurance and Recognition of Qualifications**
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Meta Frameworks and Sectoral Frameworks...

The Recognised Relevance of Sectoral Frameworks (I)


✉ **Excerpt of the Document “BFUG - Bologna Beyond 2010”, February 2010**

“... While learning outcomes have been generically defined for the degree structure in the context of the Dublin descriptors, the key point is to develop subject specific descriptors for knowledge, skills and competences.”

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Meta Frameworks and Sectoral Frameworks...


The Recognised Relevance of Sectoral Frameworks (II)

Taken from the BFUG document - Bologna Beyond 2010
February, 2009


"Common reference points could also be developed for an entire sector , which might lead to the definition of sectoral descriptors and the establishment of sectoral qualifications frameworks..."

If sectoral descriptors were to be developed it must be done in such a way that they relate to the national and existing European frameworks"

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Meta Frameworks and Sectoral Frameworks...

The Recognised Relevance of Sectoral Frameworks (III)

Taken from the Leuven/Louvain-la-Neuve Communiqué
29 April 2009


"...

Curricular reform will thus be an ongoing process leading to high quality, flexible and more individually tailored education paths.


Academics, in close cooperation with student and employer representatives, will continue to develop learning outcomes and international reference points for a growing number of subject areas

..."

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Meta Frameworks and Sectoral Frameworks...

Bringing Qualifications Frameworks into Practice

I - Sectoral or Subject Specific Frameworks

The case of the Engineering Area


Initiatives that came to life along the years

- ☞ **TUNING methodology**
 - ✓ **E4 proposals**
- ☞ **TU3 proposals - Delft, Eindhoven e Twente**
- ☞ **CDIO - Conceive-Design-Implement-Operate**
- ☞ **ABET standards for professional quality assurance**
- ☞ **EUR-ACE standards for quality assurance**
- ☞ **European projects to identify core knowledge and competences at discipline level**
- ☞ **Initiatives leading to core curricula recommendations**
 - ✓ **European Working Parties on Education and joint initiatives at academic level**


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Meta Frameworks and Sectoral Frameworks...

The EUR-ACE Accreditation System


I - System Characterization

- ☞ **Programme Assessment Procedures should include clear information and evidence on the following components:**
 - ✓ **Needs, objectives and outcomes**
 - ✓ **Educational process**
 - ✓ **Resources**
 - ✓ **Assessment of the educational process**
 - ✓ **Management system**
- ☞ **In this context 'the criteria to be assessed' and the associated 'requirements' in the form of questions, valid for both FC and SC programmes should be addressed when assessing an engineering programme on education**


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Meta Frameworks and Sectoral Frameworks...

The EUR-ACE Accreditation System

II - Knowledge and Competence areas


☞ **Programme Outcomes that must be satisfied**

- **6 areas of competences are defined**
 - ✓ **Knowledge and Understanding**
 - ✓ **Engineering Analysis**
 - ✓ **Engineering Design**
 - ✓ **Investigations**
 - ✓ **Engineering Practice**
 - ✓ **Transferable (personal) Skills**
- **For each category, the EUR-ACE Framework Standards list the expected Programme Outcomes of First Cycle and Second Cycle Studies**


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Meta Frameworks and Sectoral Frameworks...

Qualifications Frameworks and Quality Assurance

I - Clustering of qualifications descriptors

QF-EHEA - EQF-LLL - EUR-ACE



Table 1 - Clustering of qualifications descriptors in different frameworks


Bologna, QF-EHEA	EU, EQF-LLL	EUR-ACE
A. Knowledge and understanding	1. Knowledge	I. Knowledge and understanding
B. Applying knowledge and understanding	2. Skills	II. Engineering analysis
C. Making Judgments	3. Competences	III. Engineering design
D. Communications skills		IV. Investigations
E. Learning skills		V. Engineering practice
		VI. Transferable skills

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Meta Frameworks and Sectoral Frameworks...

Qualifications Frameworks and Quality Assurance

II - What is equal, what is different (II)

EUR-ACE First Cycles / QF-EHEA-First Cycles / EQF-LLL- Level 6

EUR-ACE - First Cycles

	I.1	I.2	I.3	I.4	II.1	II.2	II.3	III.1	III.2	IV.1	IV.2	IV.3	V.1	V.2	V.3	V.4	VI.1	VI.2	VI.3	VI.4	VI.5
QF - EHEA	FC-A																				
	FC-B																				
	FC-C																				
	FC-D																				
	FC-E																				
EQF-LLL	L6.1																				
	L6.2																				
	L6.3.1																				
	L6.3.2																				

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Qualifications Frameworks and Quality Assurance

II - What is equal, what is different (III)


EUR-ACE Second Cycles / QF-EHEA-Second Cycles / EQF-LLL- Level 7

		EUR-ACE - Second Cycles																		
		L1	L2	II.1	II.2	II.3	II.4	III.1	III.2	III.3	IV.1	IV.2	IV.3	IV.4	V.1	V.2	V.3	VI.1	VI.2	VI.3
QF - EHEA	SC-A	■	■																	
	SC-B			■	■	■	■	■							■	■	■			
	SC-C					■	■	■	■	■					■	■	■	■		
	SC-D																		■	■
	SC-E				■							■	■	■	■					
EQF-LLL	L7.1.1	■	■																	
	L7.1.2	■	■																	
	L7.2			■	■	■	■	■	■	■	■	■	■	■						
	L7.3.1														■			■	■	
	L7.3.2																■		■	■

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Descriptors at Syllabus (contents) level

I - Recommendations of the WPE-EFCE (I)


 **WPE-EFCE - Working Party on Education - European Federation of Chemical Engineering**

- ✓ **Currently with 38 members, representing 24 Countries**
- ✓ **Developed between 2003 and 2005 an exercise of identification of core curriculum for chemical engineering - contents and methodologies**
- ✓ **See EFCE Site and Bologna Recommendations (2005) at**
<http://www.efce.info/wpe.html>
http://www.efce.info/Bologna_Recommendation.html


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Meta Frameworks and Sectoral Frameworks...

Descriptors at Syllabus (contents) level

I - Recommendations of the WPE-EFCE (II)

 **These recommendations cover**

- **Learning outcomes**
 - General chemical engineering skills and knowledge
 - Transferable skills
- **Achieving the learning outcomes**
 - Core curriculum
 - Teaching and learning
 - Industrial experience
 - Review of the educational process
 - Student assessment



 **The core curriculum proposed covers only approx. two thirds of a first and a second level degree study**

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Descriptors at Syllabus (contents) level



II - The CHEMEPASS Project (2006-2009) (I)

- ☞ **Financed by the European Commission within the Erasmus Mundus Programme - Action 4: "Enhancing Attractiveness". Started: November 2006. E.U. grant for 3 years.**
- ☞ **Composed of 13 Higher Education Institutions of 9 European countries and 1 of South Africa:**

CPE Lyon (France) (Coordinator), **Institut Quimic de Sarrià** (Spain), **Universidade do Porto** (Portugal), **Politecnico di Torino** (Italy), **INPL-ENSIC Nancy** (France), **INPT-ENSIACET Toulouse** (France), **Technische Universiteit Delft** (The Netherlands), **University College Dublin** (Ireland), **Technische Universität München** (Germany), **UCTM Sofia** (Bulgaria), **Jagiellonian University** (Poland), **Lappeenranta University of Technology** (Finland), **Durban University of Technology** (South Africa).

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Descriptors at Syllabus (contents) level

II - The CHEMEPASS Project (2006-2009) (II)

- ☞ **Milestones**
 - ✓ **Identification of relevant general and specific Learning Outcomes for Chemical Engineering Programmes**
 - ✓ **Identification of knowledge to be tested among Chemical Engineering core subjects**
 - ✓ **Development of a database with test questions**

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Meta Frameworks and Sectoral Frameworks...

Academic Degree Structures in Engineering Concerning levels of qualification


☞ **Two levels of qualifications associated to those levels approved in the Directive of Professional Recognition and recognized in the EQF-EHEA and the EQF-LLL**

- **1st Cycle, Level 6, Art. 11, d): (3-4)U**
 - ✓ **First Cycle Degrees are the basis for achieving the qualification of Technical (or Associate) Engineers, whatever the European designation**
- **2nd Cycle, Level 7, Art. 11, e): >= 4U**
 - ✓ **Second Cycle Degrees are the basis for achieving the qualification of Engineers, or equivalent European designation**


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Meta Frameworks and Sectoral Frameworks...

Academic Degree Structures in Engineering Concerning Profiles


☛ **Two main profiles in Engineering**

- **More Theoretically oriented**
 - ✓ Programmes with a stronger emphasis on basic and engineering sciences in the first years
 - ✓ Generally linked to Second Cycle degrees
- **More Applications oriented**
 - ✓ Designed to qualify after First Cycle, independently of pursuit of studies through Second Cycles, be it directly or through bridging programmes


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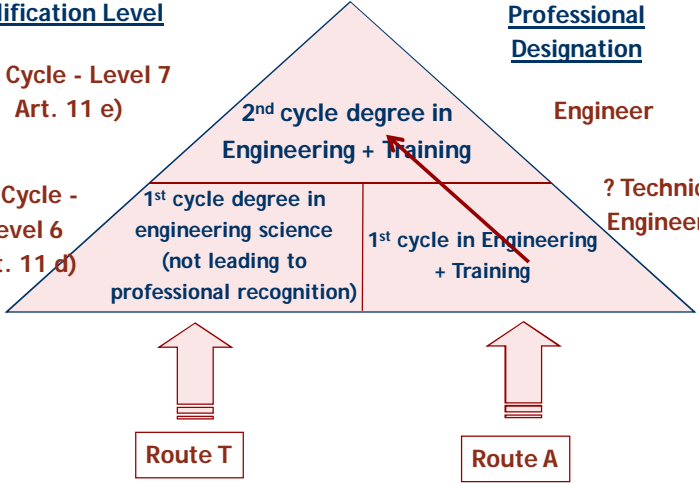
Meta Frameworks and Sectoral Frameworks...

Academic Degree Structures in Engineering Routes for the different qualification levels

Qualification Level

2nd Cycle - Level 7
Art. 11 e)

1st Cycle - Level 6
Art. 11 d)



Professional Designation

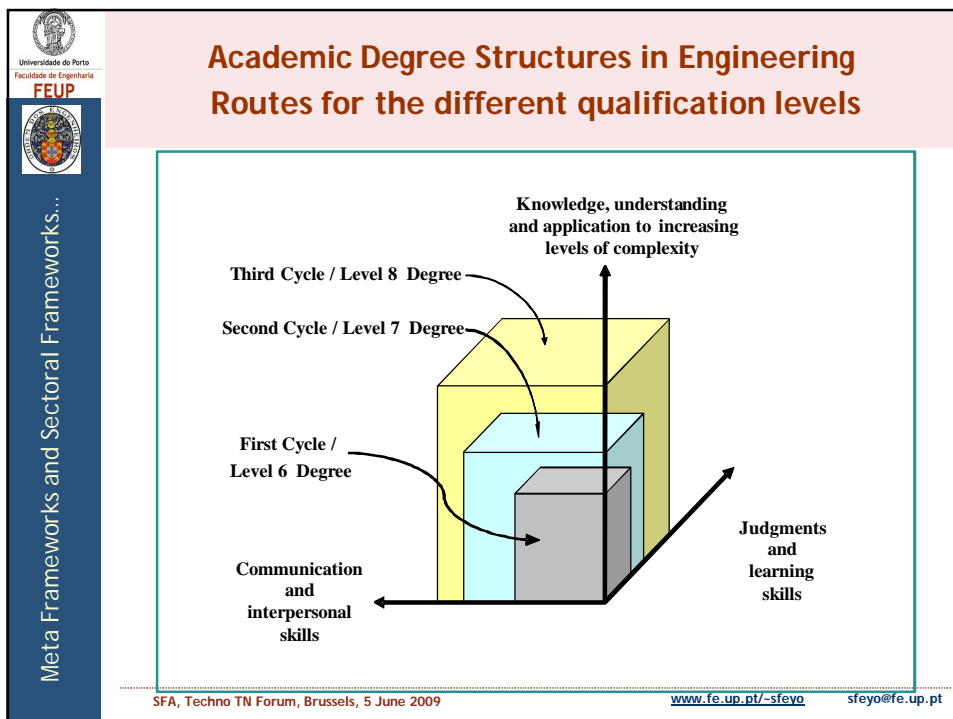
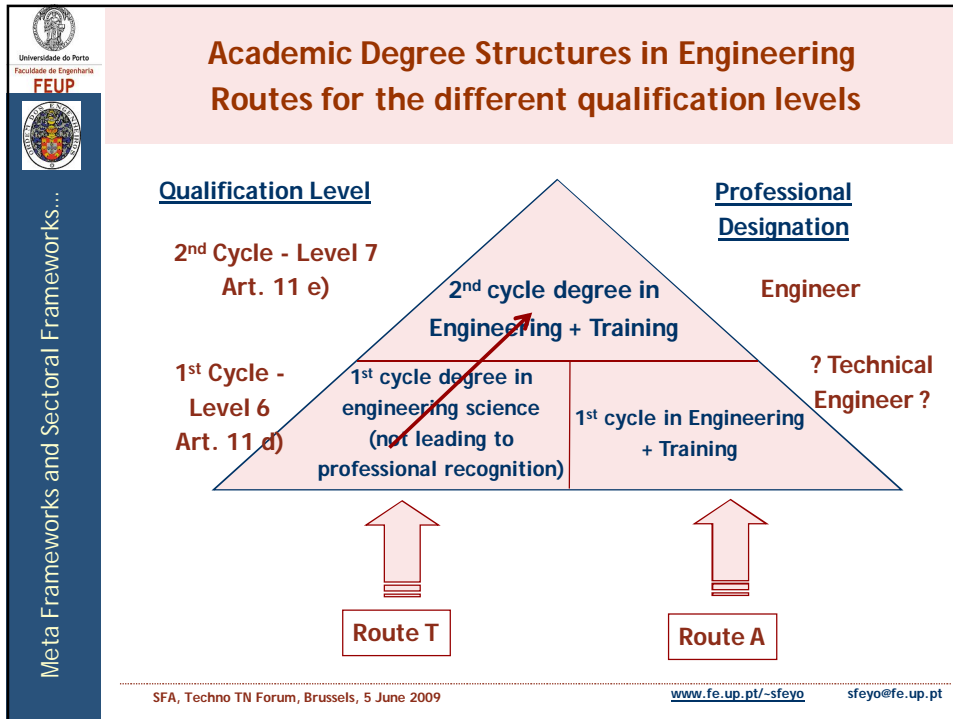
Engineer


? Technical Engineer ?

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Meta Frameworks and Sectoral Frameworks...

Academic Degrees in Engineering

Understanding fundamental differences between levels of qualifications for professional purposes

☞ **Programme Outcomes must be evaluated in relation with the level of intervention in the Engineering Activity**

- Social responsibility (namely, signing projects)
- Capacity to tackle large, complex problems
- Capacity to adapt to new jobs of high complexity and responsibility
- Capacity for effective activity in the production line
-

☞ **For the different subsets of Programme Outcomes, and for the First and Second Cycle Degrees in Engineering, the differences in outcomes are mostly related with**

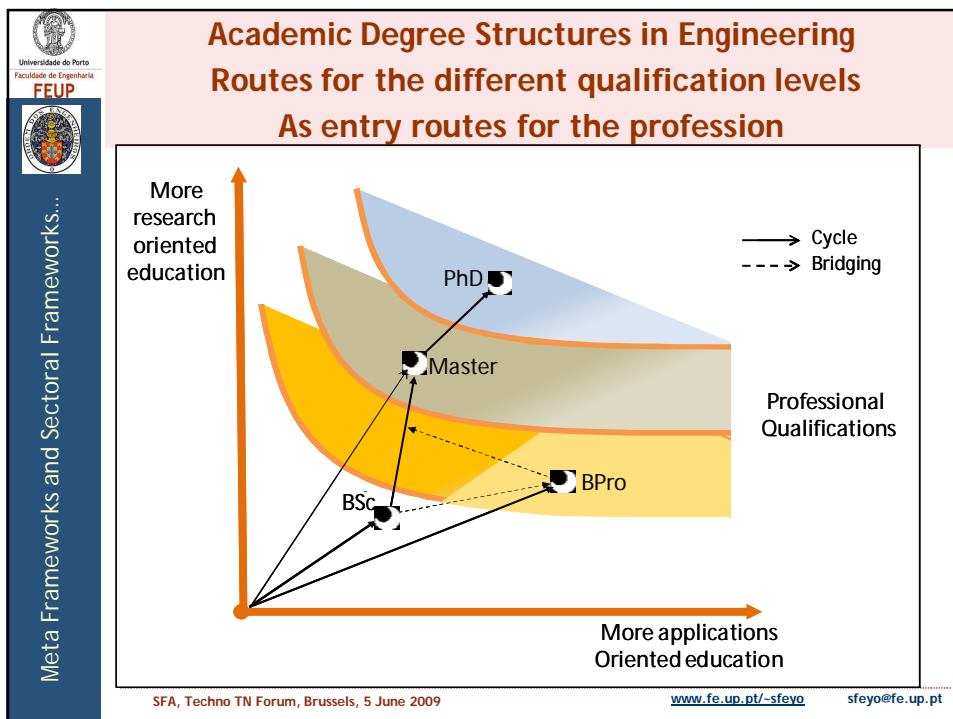
- **scope, depth and breadth**

☞ **For the Master degree, developing the right **ATTITUDE** to use knowledge or skills in a given situation is a major outcome**

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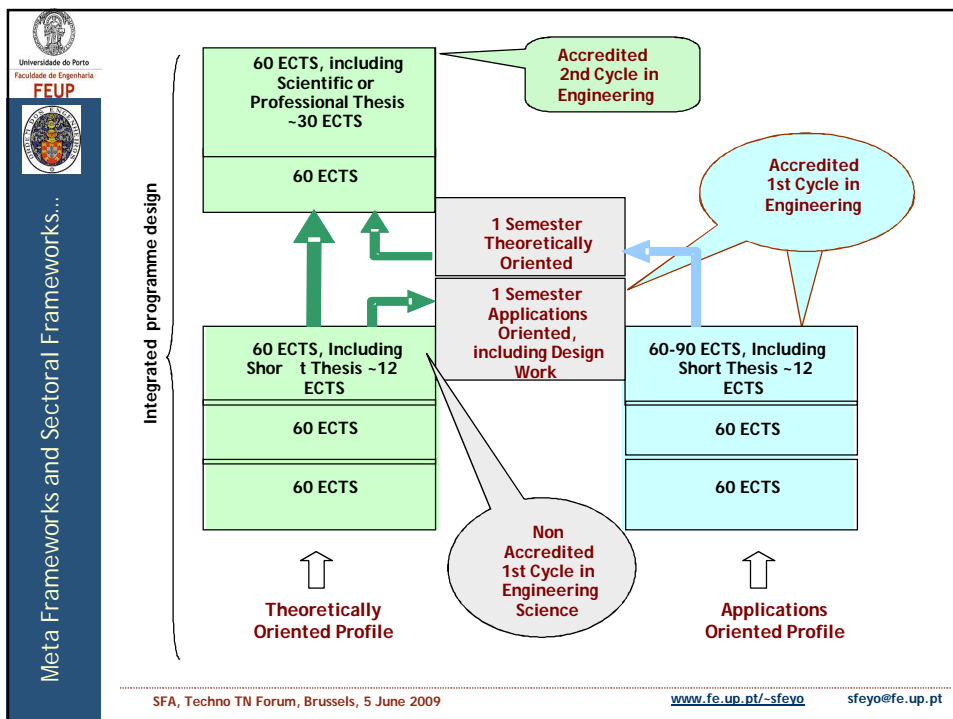
Meta Frameworks and Sectoral Frameworks...


Academic Degree Structures in Engineering

Prevailing concepts in the design of the Degree System


- ☞ **More flexible paths - MORE differentiation (competences) offered**
 - Either more research oriented, or more innovation oriented, or with a higher entrepreneurial spirit, etc....
 - Bringing in the concept of "Communication Pipes" between different profiles of education - **Bridging programs**
- ☞ **More attractive offer** in order to bring into the system students with different backgrounds and interests
- ☞ **Promotion of a true offer for lifelong learning through**
 - **Complementary modules** of (advanced) specialization courses
 - Implementing the concept of 'accumulated credits' for recognition of studies

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Meta Frameworks and Sectoral Frameworks...

Academic Degree Structures and Quality Assurance in Engineering

Programme Outcomes for Accreditation (I)

- ☞ Quality assurance procedures rely on accepted qualifications frameworks
- ☞ Programme outcomes for accreditation should always be related to **potential professional recognition of engineering qualifications**


☞ **As such:**

- ☞ There should be only one set of programme outcomes for accreditation of Second Cycle Degrees
 - ☞ **(Whatever the profile and programme)**
- ☞ There should be only one set of programme outcomes for accreditation of First Cycle Degrees


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Meta Frameworks and Sectoral Frameworks...

A Case-Study of integration of frameworks


The VDI-GVC Recommendation for Chemical and Processing Engineering (2008) (I)

- ☞ VDI-GVC approved qualifications frameworks for degree course for Process Engineering, Chemical Engineering and Biomolecular or Bioprocess Engineering
- ☞ Recommendations cover both 'more theoretically oriented' and 'more vocationally oriented' profiles
- ☞ Recommendations apply to consecutive Bachelor's and Master's degree courses


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Meta Frameworks and Sectoral Frameworks...

A Case-Study of integration of frameworks

The VDI-GVC Recommendation for Chemical and Processing Engineering (2008) (II)

☞ **Recommendations are structured in:**

- ✓ Professional profile and qualification framework
- ✓ Qualifications for admission to the course
- ✓ Structure of the degree course
- ✓ Contents of the degree course

☞ **The Professional profile and qualification framework is organized in the six main outcomes adopted by EUR-ACE**

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Meta Frameworks and Sectoral Frameworks...

Recognition of Qualifications - a Worldwide Issue

European Frameworks in Engineering and existing global 'accords' [W-S-D] (I)

☞ ***Different "accords":***

- Washington Accord
- Sydney Accord
- Dublin Accord

☞ ***Different "registers":***

- EMF International Register of Professional Engineers
- ETMF International Register of Engineering Technologists
- APEC Register of Professional Engineers

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Meta Frameworks and Sectoral Frameworks...

Recognition of Qualifications - a Worldwide Issue


European Frameworks in Engineering and existing global 'accords' [W-S-D] (II)

- ☞ **Fundamental differentiation/barrier in other accords, between**
 - "Professional Engineers" and
 - "Engineering Technologist"
- ☞ **Define all recognized (accredited) "Engineers' " degrees as "Bachelor" .**
- ☞ **These features are not in the spirit of the EQF nor of EU Directive 2005/36**
- ☞ **Indeed discussion is currently in the air, and will have to be continued, concerning recognition of standards**


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Meta Frameworks and Sectoral Frameworks...

Recognition of Qualifications - a Worldwide Issue

III - OECD Initiative


AHELO - Assessment of HE Learning Outcomes

- ☞ **Potentially the largest, most comprehensive assessment of universities yet devised**
 - The aim is to measure various types of Learning Outcomes and to examine a wide range of possible criteria to assess their influence in those outcomes
- ☞ **10 Countries involved in the start-up, on May 2008**
 - Australia, Belgium (Flanders), Finland, Italy, Japan, Korea, Mexico, The Netherlands, Norway, Sweden
- ☞ **Composed of four strand of work**
 - Assessment of generic skills
 - Assessment of discipline-specific skills in Engineering
 - Assessment of discipline-specific skills in Economics
 - Research-based value-added strand - assessing the "value-added" factors of Higher Education Institutions


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Meta Frameworks and Sectoral Frameworks...


To say what I am going to say...

- ① **Setting the stage**
 - ① Life Today
 - ① From Bologna to Leuven... and beyond - the core of the reforms
- ② **Qualifications Frameworks**
 - ② QF complementary layers - Meta Frameworks
 - ② QF complementary layers - Sectoral Frameworks
 - ② QF complementary layers - Descriptors at Syllabus level
- ③ **Quality Assurance and Recognition of Qualifications**
 - ③ Academic degree structures and Quality Assurance in Engineering
 - ③ Recognition in a global context
- ④ **Closing Notes**

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Meta Frameworks and Sectoral Frameworks...

The Core of the Bologna Reforms


Keywords characterizing Structural Issues

- ☞ **MOBILITY, COOPERATION, TRUST, ACCREDITATION**
- ✓ **MOBILITY AND COOPERATION** require professional recognition
- ✓ **Professional recognition** requires **TRUST**
- ✓ **TRUST** requires transparency and readability of structures and professional qualifications
- ☞ **All is achieved through:**
- ✓ **COMPARABLE QUALIFICATIONS FRAMEWORKS**
- And**
- ✓ **RECOGNISED QUALITY ASSURANCE PROCEDURES**

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Meta Frameworks and Sectoral Frameworks...


Bologna, Qualifications Frameworks and Engineering Education

- ☞ The Engineering Profession requires different qualification levels and education profiles that should be guaranteed and identified through transparent Quality Assurance Procedures
- ☞ The framework being developed and put in practice within the Bologna agreements seem to serve adequately the needs of industry and society in general
 - ✓ Short vocational studies, first cycle studies and second cycle studies (stand-alone or integrated) constitute the basis of such framework
- ☞ The concept of Credit Accumulation, together with Lifelong Learning, is of utmost relevance in this new paradigm of building professional qualifications

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Meta Frameworks and Sectoral Frameworks...

Quality Assurance, Meta Qualifications Frameworks and Sectoral Frameworks

- ☞ Quality Assurance procedures should
 - ✓ Include criteria that are in substantial conformity with accepted descriptors at meta, sectoral and syllabus level
- ☞ National Frameworks are the reference,
 - ✓ but these should be in substantial conformity with Frameworks at all levels developed within the Bologna Process or other transnational cooperation

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Mobility and Recognition of Qualifications

- ☞ **Mobility is a distinctive need of Today's Global World**
- ☞ **Recognition of professional qualifications is a major task ahead...**
- ☞ **Mobility and Recognition of Qualifications are not an illusion, a dream, an objective or a target...**

They are as MUST...

Required for Peace and Progress on Earth