



The Importance of Bologna for the University and Industry

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To say what I am going to say...

Bologna, University and Industry

- ① What is at stake - Bologna and the European Strategy for Development
- ② Two major documents in 2005
 - ② The Bergen Communiqué and the European Directive on Professional Recognition
 - ③ Academic Degrees and Recognition of Professional Qualifications in Engineering
 - ③ Characterization of Levels and Profiles
 - ③ Outcomes and Accreditation
- ④ Bologna and Routes for different professional qualification levels and for transnational cooperation

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Recall what is at stake... European Strategy for Development

- ☞ Last quarter of the 20th Century - Intense search of new routes for Europe and for the World
- ☞ Culminated with the European Council of Heads of State and Governments, March 2000, Lisbon
 - ✓ The Lisbon Strategy for Growth and Jobs
 - ✓ Competitive positioning relatively to the other blocks of the Planet
 - ✓ Stating of a strategic objective:

“By 2010, making Europe the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion” .

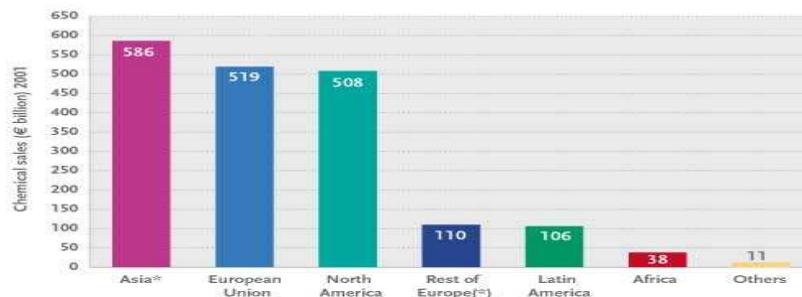
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A simple example of World Competition Geographic breakdown of world chemicals production



World chemicals production in 2001 is estimated at € 1,878 billion. The EU accounts for 28% of the total.

Sources: Cefic, NCF (National Chemical Federations), United Nations and ACC (American Chemistry Council)

Notes: * estimated
(*) Rest of Europe – Switzerland, Norway, Central & Eastern Europe, and Turkey
Asia: including Japan and China



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The Lisbon Strategy for 2010: The three dimensions of the Strategy

- ☞ A strategy based on Knowledge and Transnational Cooperation, where we can recognize -
 - ✓ The Economy Dimension -
 - Including the movement that converged in the creation of the EURO
 - ✓ The Social Dimension -
 - In line with the European culture of humanism, reasoning, freedom and democracy
 - ✓ The Knowledge Society Dimension -
 - Identified with the Bologna Process and the creation of the European Higher Education Area



Political issues and changing paradigms

- ☞ How to combine these dimensions in drawing the European Trajectory of Development?
- ☞ Where to draw the line for promoting the enlarging of higher education? For mass education?
- ☞ Which framework for development?
 - ✓ A new offer of degrees
 - ✓ New methods of education
 - ✓ LLL policies
 - ✓ Promoting TRUST for mobility and cooperation
 - Transparency, readability
 - Quality Assurance



From Bologna ... To Bergen... And to London Main reform areas in Higher Education (I)

- ☞ Higher Education Institutions face the challenge of these changing paradigms of living
 - ✓ Face changing concepts of social responsibility in answering societal needs in a shorter term than they were used to
 - ✓ Face the pressure for curricular reforms
 - ✓ Face changing concepts of accountability
- ☞ HEI face changing concepts of autonomy and freedom, much in that
 - They are part of the Universe... not the Universe itself...



From Bologna ... To Bergen... And to London Main reform areas in Higher Education (II)

- ☞ Curricular reform
 - ✓ Degree System and Teaching / Learning Paradigms
 - Short Cycles, First Cycles, Second Cycles, Third Cycles
 - Competence based learning
 - Flexible learning paths
 - Overall - wider, **differentiated**, more attractive offer
 - ✓ Quality Assurance
 - Peer review of quality assurance on a national basis
 - European register of quality assurance agencies
 - ✓ Recognition of degrees and study periods
 - Putting in place mobility instruments
 - Recognition of foreign qualifications
 - Recognition of prior learning
 - Recognition of credit accumulation



From Bologna ... To Bergen... And to London Main reform areas in Higher Education (III)

☞ Funding Reform -

- ✓ Different sources of income
- ✓ Fees
- ✓ Grants
- ✓ EU fundings...

☞ Governance Reform -

- ✓ Autonomy
- ✓ Accountability
- ✓ Strategic partnerships for which Quality Assurance is a major issue



To say what I am going to say...

- ① What is at stake - European Strategy for Development
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 - ② **The Bergen Communiqué and the European Directive on professional Recognition**
- ③ Academic Degrees and Recognition of Professional Qualifications
 - ③ Characterization of Levels and Profiles
 - ③ Outcomes and Accreditation
- ④ Summarizing routes for different professional qualification levels



Two major documents in this framework of development I - The Bergen Declaration within the Bologna Process (I)

- ☞ The Bergen Communiqué signed by Ministers of Education of 45 Countries reaffirms the Bologna Process and gives a step forward
 - ✓ Adopts the overarching framework for qualifications in the EHEA, comprising three main cycles and a short cycle
 - ✓ Adopts the standards and guidelines for quality assurance in the European Higher Education Area as proposed by ENQA.
 - Will introduce a model for peer review of quality assurance agencies on a national basis,
 - Welcomes the principle of a European register of quality assurance agencies based on national review.
 - ✓ Recognition of degree and study periods
 - Commitment to the recognition of foreign qualifications
 - Improve recognition of prior learning, including non-formal learning

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Two major documents in this framework of development I - The Bergen Declaration within the Bologna Process (II)

- ☞ Innovates the offer of education, promoting a more basic level of professional relevance
- '..... We adopt the overarching framework for qualifications in the EHEA, comprising three cycles including, within national contexts, the possibility of intermediate qualifications generic descriptors for each cycle based on learning outcomes and competences...'*
- ☞ There is a clear coordination with the Copenhagen Process for enhancing cooperation in Vocational Education and Training, launched in 2002

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Two major documents in this framework of development II - The Directive for the Recognition of Professional Qualifications (I)

☞ Reaffirms previous Directive, accepting 7 professional areas with recognized specifications

- ✓ Medical training Minimum education - 6 anos IT
- ✓ Training of veterinary surgeons Minimum education - 5 anos IT
- ✓ Basic dental training Minimum education - 5 anos IT
- ✓ Training as pharmacists Minimum education - 5 anos IT
- ✓ Training of nurses Minimum education - 3 anos IT
- ✓ Training of midwives Minimum education - 3 anos IT

- ✓ Training of architects Minimum education - 4 anos IT

☞ Engineering is out of this group



Two major documents in this framework of development II - The Directive for the 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



Two major documents in this framework of development II - The Directive for the Recognition of Professional Qualifications (III)

- ☞ Art. 11, e)
...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)
...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)
...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...



A striking coincidence or concerted action?

- ☞ The Bergen Declaration and the Directive point out in the same direction
 - ✓ Recognition of different qualification levels and profiles
 - ✓ Recognition that qualifications can be attained through routes in two different subsystems
- ☞ They fit remarkably well in the world of engineering and the offer of engineering education in Europe
- ☞ They should obviously be translated into our accreditation systems



To say what I am going to say...

- ① What is at stake - European Strategy for Development
- ② Two major documents in 2005
 - ② The Bergen Communiqué and the European Directive on professional Recognition
- ③ **Academic Degrees and Recognition of Professional Qualifications**
 - ③ **Characterization of Levels and Profiles**
 - ③ **Outcomes and Accreditation**
- ④ Summarizing routes for different professional qualification levels



Academic Degrees and Recognition of Professional Qualifications I - Concerning level of qualification - (I) - Art. 11, c)

- ☞ **Level of Qualification: Art. 11, c)**
 - **1 year of post-secondary course work + Professional Training $\geq Z$, with $Z=1$**
- ☞ **At least for the time being, in most countries, not leading to a recognised competence group of Engineering, though they are vital for the 'Engineering Act'...**
- ☞ **Let's identify them as Technicians**



Academic Degrees and Recognition of Professional Qualifications I - Concerning levels of qualification - (II) - Art. 11, d) and e)

- ☞ **Two levels** of qualifications associated to those levels approved in the Directive
- ☞ **LEVEL 1** - Art. 11, d): (3-4)U + Professional Training \geq Y, with Y=?
 - **First Cycle Degrees** are the basis for achieving the qualification of **Associate Engineer, or equivalent European designation**
- ☞ **LEVEL 2** - Art. 11, e): \geq 4U + Professional Training \geq X, with X=?
 - **Second Cycle Degrees** are the basis for achieving the qualification of **Engineer, or equivalent European designation**



Academic Degrees and Recognition of Professional Qualifications II - Concerning Profiles

- ☞ **Two main engineering profiles**
 - **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



Academic Degrees and Recognition of Professional Qualifications III - Offer of Programmes (I)

- ☞ **Three main offers of Programmes in Engineering Education**
 - The offer of two-cycle programmes, within a philosophy of integrated studies, aiming mainly at fulfilling the requirements of accreditation and professional recognition at LEVEL 2
 - The offer of first-cycle programmes, aiming at fulfilling the level of requirements for accreditation and professional recognition of LEVEL 1
 - The offer of second-cycle programmes, aiming at fulfilling the level of requirements for accreditation and professional recognition of LEVEL 2



Academic Degrees and Recognition of Professional Qualifications III - Offer of Programmes (II)

- ☞ **Research Oriented Schools should favour one route with two cycles, with more theoretically oriented programmes**
 - Programmes should be designed in terms of integrated outcomes after the Second Cycle
 - Academic competence either in Engineering or in Engineering Science, should be recognized in the form of a First Cycle Degree, comprising 180 to 210 ECTS, not more...
 - ❖ Moreover, the Second Cycle of such programmes should be flexible enough to accommodate new public, within mobility programs

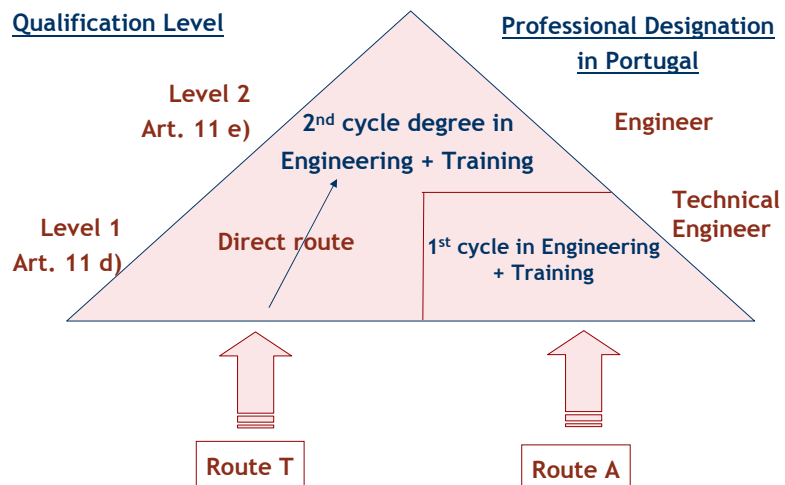


Academic Degrees and Recognition of Professional Qualifications III - Offer of Programmes (III)

- ☞ As for the general or wider offer, in some Universities and in Polytechnics
 - First cycle programmes should meet the requirements for accreditation and professional recognition
- Major political issues
 - How to regulate the offer of public schools?
 - Which criteria for approving and financing 'theoretically oriented integrated programmes' in public schools?

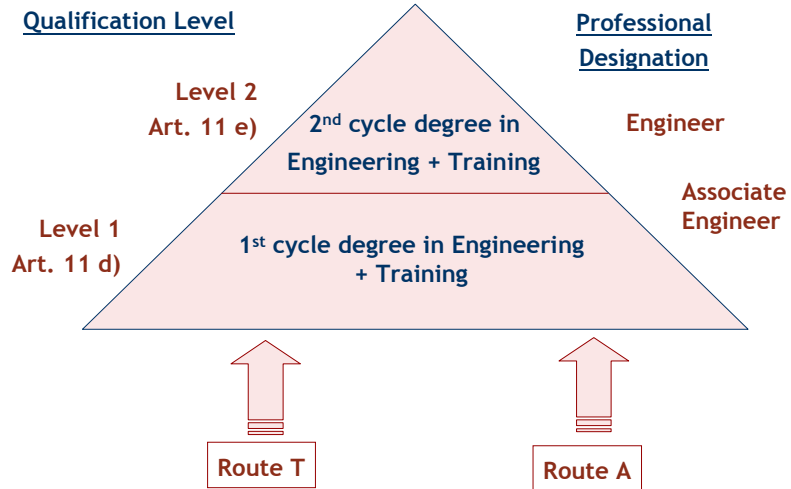


Academic Degrees and Recognition of Professional Qualifications IV - Routes for the different qualification levels (I) (Not in the spirit of the Bologna Process)





Academic Degrees and Recognition of Professional Qualifications IV - Routes for the different qualification levels (II)



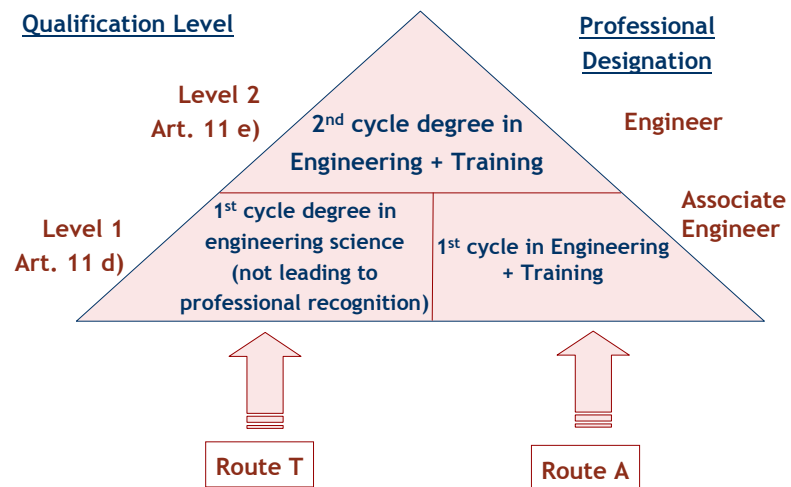
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Academic Degrees and Recognition of Professional Qualifications IV - Routes for the different qualification levels (III)



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Academic Degrees and Recognition of Professional Qualifications III - Offer of Programmes (IV)

Bologna, University and Industry

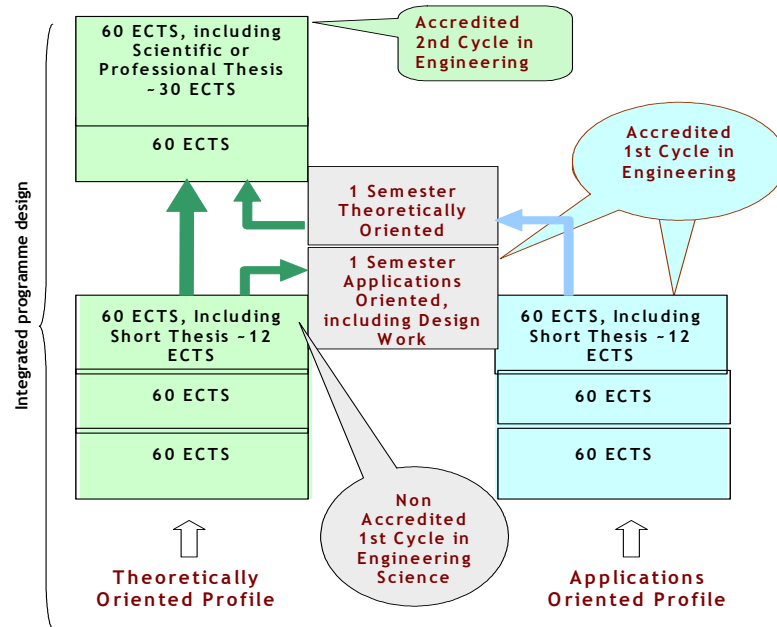
What in all is most relevant, and not so much spoken

Increase the attractiveness of the offer in order to bring into the system students with different backgrounds and interests

- Providing bridging programs
- Implementing the concept of 'accumulated credits'
- Creating a true offer for lifelong learning through complementary modules of (advanced) specializations courses



Bologna, University and Industry





Academic Degrees and Recognition of Professional Qualifications V - Competences, Expectations from Industry, Cooperation

- ☞ New structures and programmes seem to answer more adequately the requirements of the Industry, particularly in the differentiation (of competences) offered
- ☞ With new, more flexible paths, it is expected that more diverse profiles of students are developed (more research oriented, more innovation oriented, with a higher entrepreneurial spirit, etc.)
- ☞ New competences and skills, particularly soft skill, will bring young candidates more ready for the job market than before
- ☞ Accreditation procedures should play a major role in required harmonization for improving mobility and cooperation



Academic Degrees and Recognition of Professional Qualifications VI - Programme Outcomes for Accreditation (I)

- ☞ 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



Academic Degrees and Recognition of Professional Qualifications VI - Programme Outcomes for Accreditation (II)

- ☞ Programme Outcomes must be evaluated in relation with the level of intervention in the Engineering Act
 - 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, the differences in requirements are mostly related with
 - **scope, depth and breath**



Academic Degrees and Recognition of Professional Qualifications VI - Programme Outcomes for Accreditation (III)

- ☞ Programme Outcomes for Accreditation of Second Cycle Degrees
 - ✓ Whatever the programme and profile, be it an 'Integrated Programme' (?) or First-Second Cycle Degree, we must evaluate Integrated Outcomes
 - ✓ We are not going to accredit the part corresponding to '120 ECTS'...
- ☞ Programme Outcomes for First Cycle Degrees
 - ✓ In Integrated or 'more theoretically oriented profiles' the 'First Cycle within these programmes' may not meet the requirements for accreditation
 - ✓ First Cycle Degrees for 'more applications oriented programmes' must aim at satisfying such requirements



Academic Degrees and Recognition of Professional Qualifications VII - The EUR-ACE Project (I)

- ☞ **European Project of significant relevance, that aimed at establishing an European System for Accreditation of Engineering Education programmes**
- ✓ **14 European Institutions, among them the Portuguese Order of Engineers**
 - **FEANI, SEFI, CESAER, EUROCADRES, ENQHEEI, ASIIN, CTI, IEI, CoPI, UNIFI, OE, UAICR, RAEE, EC-UK**
- ☞ **The EUR-ACE Project was concluded in 2005 and has established:**
 - ✓ **Standards for Second Cycle degrees, viewed in an integrated perspective**
 - ✓ **Standards for First Cycles**



Academic Degrees and Recognition of Professional Qualifications VII - The EUR-ACE Project (II)

- ☞ **The EUR-ACE project has lead to the creation in February 2006 of an European Association**
- ✓ **The ENAEE - European Network for Accreditation of Engineering Education**
- ☞ **The ENAEE is responsible for maintaining and awarding the EUR-ACE label**
- ☞ **6 European Agencies are currently accredited for awarding the EUR-ACE Label**
- ✓ **The Order of Engineers is one such Agency and is now preparing its accreditations**



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- ④ **Summarizing: Bologna, routes for different professional qualification levels and for transnational cooperation**



Bologna and Routes for Professional Qualification and Transnational Cooperation (I)

- ☞ 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



Bologna and Routes for Professional Qualification and Transnational Cooperation (II)

- ☞ Second Cycle Programmes should be evaluated in terms of integrated outcomes
 - ✓ They should meet the requirements for professional recognition of the highest engineering level (Engineer or equivalent designation at European level)
- ☞ Professionally oriented First Cycle Degrees offer relevant competences to the Society in the engineering profession (those of qualified Associate Engineer or equivalent designation at European level)
- ☞ First Cycle Degrees offered within theoretically oriented profiles **may not meet** immediately the requirements for professional recognition of First Cycles



Bologna and Routes for Professional Qualification and Transnational Cooperation (III)

- ☞ Transnational cooperation and professional mobility require TRUST
- ☞ The mechanisms to build and consolidate such TRUST are indeed slowly, but steadily, being implemented in our Higher Education Institutions...
- ☞ Within the diversity of our cultures and traditions, and with the corresponding healthy difficulties, the common future of Europeans is being built...